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**STRATEGIC PLANNING FOR AN AGRICULTURAL FARM START-
UP IN NEPAL**

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ABSTRACT

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<p>As a final thesis, a comprehensive study of various subjects related to establishing and sustaining an agricultural farm in Nepal was done. The overall current situation of agriculture industry in Nepal and its prospects are acknowledged throughout this thesis. This study also aimed to recognize how agricultural farms can contribute in strengthening the national economy and environment. One important finding is that a significant demand for agricultural products exist in Nepalese market. If invested carefully, very attractive returns could be produced from agricultural farms. The increased health consciousness of consumers has resulted in an incremental trend of demand for natural and healthy Agri-products.</p> <p>Strategic planning for starting the business was done along with an assessment of existing constraints in the agricultural value chain. Brief ideas for mission, vision and values are presented, based on which a farm can perform effectively. Financial management, product and production, logistics, Human Resource and marketing aspects are described as essential parts of the strategic plan. Moreover, the environmental factors are analysed for understanding possible opportunities and risks. The organizational operations and control measures are outlined which help in creating profitability, efficiency, and sustainability through various functions of the farm.</p>		

Key words

Agriculture, Strategy

CONCEPT DEFINITIONS

ADS	Agriculture Development Strategy
APP	Agriculture Perspective Plan
CEC	Cation Exchange Capacity
DADO	District Agriculture Development Office
DUS	Distinctiveness, Uniformity, & Stability
DISSPR	District Seed Self-sufficiency Programme
GDP	Gross Domestic Product
GMO	Genetically Modified Organism
HRD/M	Human Resource Development/Management
ILO	International Labour Organization
I/NGO	International/Non-Government Organization
NAP	National Agricultural Policy
NARC	National Agriculture Research Council
NASA	National Aeronautics & Space Administration
NCP	Nepal Communist Party
NPK	Nitrogen, Phosphorous, & Potassium
NSCL	National Seed Company Limited
PESTEL	Political, Economic, Socio-cultural, Technological, Environmental, & Legal
PRMD	Pesticide Regulation & Management Division
SWOT	Strength, Weakness, Opportunity, and Threat
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific, & Cultural Organization
USDA	United States Department of Agriculture
VAT	Value Added Tax
WHO	World Health Organization

ABSTRACT
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1 INTRODUCTION

Agriculture industry is one of the major contributors to the National Gross Domestic Product (GDP) in Nepal. More than two thirds of the population are involved in farming various types of vegetables, cereals, fruits, livestock, and other crops. The majority among the livestock are goats, sheep, chicken, buffaloes, and pigs. The major portion of the crop yields and meats are consumed by farmers themselves. The remaining production is then sold in the market. Lately, people seem to have shifted their interest from agriculture to other economic activities. Moreover, the increasing use of chemical fertilizers and hybrids continue to deteriorate the productivity of soil. Due to this phenomenon, the supply of agricultural products is mediocre as compared to the demand. To fulfil the demand, sellers often import the products from foreign countries. (Poudel & Pudasainy 2018.)

The increasing import of agricultural products from foreign countries has been constantly depleting the economy of Nepal and to worsen the situation, the price has been sky rocketing. Though there has been little progress in agriculture sector in recent years, it needs a fundamental transformation so that the production will be optimum. Farmers will get bigger returns and country will have stronger economy. This, however, does not imply that the agricultural farms are not profitable now. It simply means that a better approach of farming is required both from the farmers' and government's side. The government's investment of Nepalese Rupees (NRs). 1 million in agriculture industry can create approximately NRs. 30.34 million worth value in national economy (Poudel & Pudasainy 2018, 30).

Since farmers are responsible for the transformation of agriculture industry at practical level, they have to implement better strategies and know-how than traditional farming methodologies. The aim of this thesis was to formulate such a strategic plan. It attempts to recognize the constraints, opportunities and methods of establishing an effective farm in Nepal. The environmental factors influencing an agricultural farm are analysed, and some light is shed on the ideas to overcome any possible constraints. Foundations for sustainability, the moral-ethics and profitability are also emphasized. A theoretical research & analysis method was used for the study. To make the thesis more relatable to real life, a case agricultural farm is imagined and, its various strategic aspects are formulated and analysed.

2 BUSINESS ENVIRONMENT ANALYSIS

There are several external factors that influence the agriculture industry in terms of demand-supply, profitability and decision making. Thus, it is essential to understand those factors and their significance in order to establish and operate an agricultural farm. Studying each factor will broaden one's understanding of the current situation of the agricultural farms, demand and supply of agro-products and competitive forces. In addition, the understanding of external environment is helpful in creating clear picture of a company's mission and vision. Upon being aware of the possible obstacles and threats in the future, strategies can be formulated either to prevent or surpass these limitations. There are several tools for environmental analysis such as PESTEL, Stakeholder analysis, SWOT, Risk Analysis etc. Some of relevant tools are used in this study.

2.1 PESTEL Analysis

PESTEL is an effective tool for analysing external forces that can influence decision making of a farm. It is an abbreviation for Political, Economic, Socio-cultural, technological, Environmental and Legal factors. Each of these forces are further studied in the following sections.

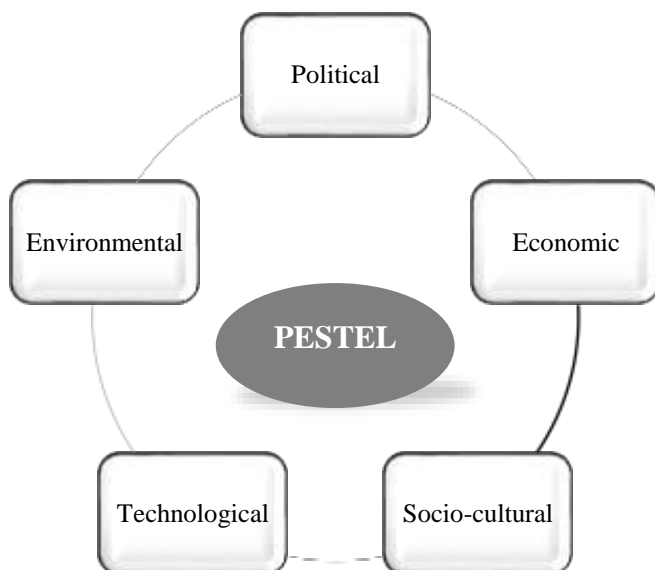


FIGURE 1. PESTEL analysis tool (Oxford College of Marketing 2016)

2.1.1 Political factor

The Federal Democratic Republic of Nepal is a South Asian country situated between two giants, India and China. Spread over an area of 147, 181 square kilometres, Nepal is a sovereign state which has never been colonized in its history. After the end of more than a century long monarchy in 2008, the landlocked country is on the verge of political transition for stability and development. Years since the fall of monarchy was a major setback for Nepali economy mainly due to the political instability. It also had a tremendous negative impact on social, cultural, and environmental aspects of the country. The constitution of Nepal 2015 assures the independence, sovereignty, secularism and inclusiveness of Nepal. It also ensures that every Nepali citizen is provided with fundamental rights, freedom and protection of the state. According to the constitution, there are three levels of governance, namely the central government, provincial government, and local bodies (village councils and municipal councils). Nepal is politically divided into 7 provinces, 14 zones, 77 districts and 744 local body systems. (Constitution of Nepal 2015.)

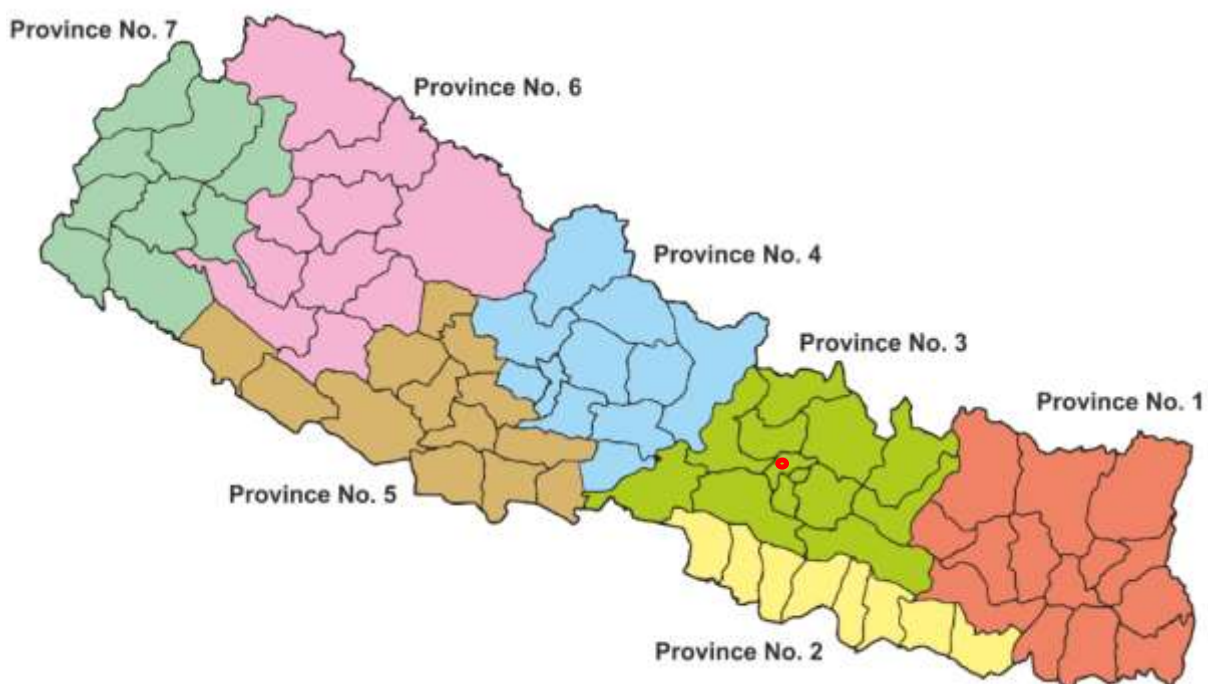


FIGURE 2. Map of Nepal (Aotearoa 2015)

Altogether there are 4 metropolises, 13 sub-metropolises, 246 municipal councils and 481 village councils. The new constitution provides authority to the local bodies to manage city police, cooperatives, local development budget, collecting tax, housing, tourism and basic & secondary education. They also have

jurisdictions over disaster management, management of drinking water systems and small projects. Along with the central and provincial governments, they will manage higher education, health, uses of natural resources and mining and minerals, among others. The new system of governance, from central, provincial and local bodies, is an opportunity to recognize the needs at both local and national level; hence better approach to create suitable solutions to meet the needs. (Constitution of Nepal 2015.)

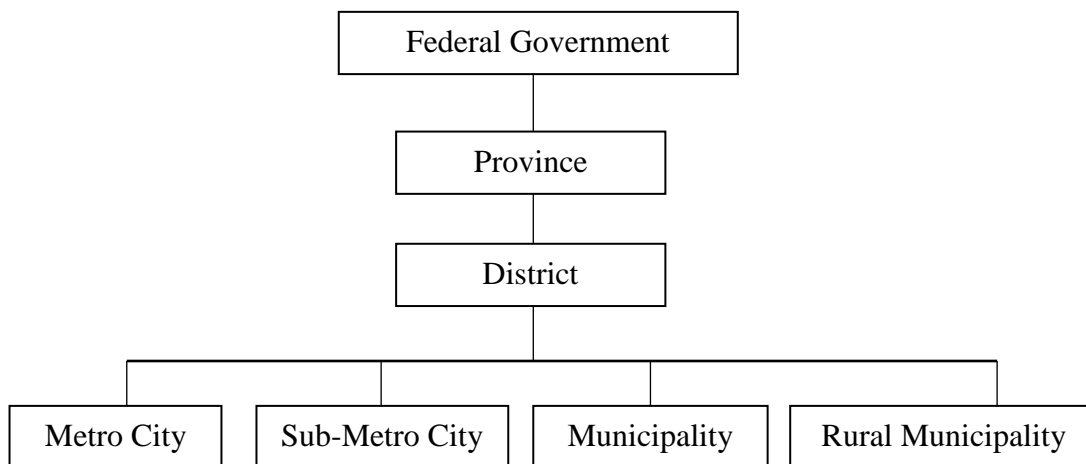


FIGURE 3. Outline of political division of Nepal (The Himalayan Times 2017)

The uncertainties in the business environment and the prolonged political instability along with the mediocre infrastructure were the foremost cause for the slow and poor industrialization in Nepal. Consequently, the agricultural farms and other firms were unable to grasp the opportunity from increased growth in domestic demand and Indo-Nepal free trade agreement with India. However, Nepalese legislative election 2017 has created a tremendous hope among the Nepali citizens. For the first time after the fall of monarchy, Nepal Communist Party (NCP) secured the majority of seats in legislative election. Mr. Khadga Prasad Oli from NCP is the current prime minister of Nepal for the term of 5 years. This is the first stable government of Nepal in the last decade. No government since 1991 had survived for more than two years. Despite challenges, Nepalese economy, environment, and infrastructure are expected to advance during his term as a prime minister. (Ghimire 2016.)

2.1.2 Economic factor

The population of Nepal, as of 2011 census, is 26,494,504 with an average growth rate of 1.35 percent (Census info of Nepal 2011). Nepal had GDP of US \$24.47 billion in 2017. According to the economic survey 2017/18 by the government of finance, the economic growth rate was 5.9 percent. In the fiscal year 2017/18, per capita income was approximated to be \$1,004. Analysing the trade of Nepal with other foreign countries, it can be concluded that the trade deficit is substantial. In 2016, Nepal imported \$6.51 billion as compared to export of \$696 million. The major export products from Nepal are woollen carpets, yarns, juices, iron& steel products and other readymade garments. On the other hand, petroleum, automobiles, iron and steel products, machinery and parts and agricultural products are main imports to Nepal (Economic Survey 2017/18). The table below shows Nepal's trade with the world since 2007 to 2017.

TABLE 1. Nepal's trade statistics (European Commission 2017)

Nepal, Trade with World								
Total Goods: Trade flows and balance								
Period	Imports		Exports		Balance		Total trade	
	Value Mio €	% Growth	Value Mio €	% Growth	Value Mio €	% Growth	Value Mio €	% Growth
2007	2,274		644		-1,631		2,918	
2008	2,441	7.3	611	-5.1	-1,830	12.2	3,052	4.6
2009	2,709	11.0	646	5.7	-2,064	12.7	3,355	9.9
2010	3,880	43.2	672	4.1	-3,208	55.5	4,552	35.7
2011	4,272	10.1	666	-0.9	-3,606	12.4	4,938	8.5
2012	4,703	10.1	693	4.1	-4,010	11.2	5,396	9.3
2013	4,880	3.8	665	-4.0	-4,215	5.1	5,545	2.8
2014	5,736	17.6	695	4.5	-5,042	19.6	6,431	16.0
2015	5,979	4.2	612	-11.9	-5,367	6.5	6,591	2.5
2016	7,174	20.0	576	-5.8	-6,598	22.9	7,751	17.6
2017	7,990	11.4	579	0.5	-7,411	12.3	8,570	10.6

Total Goods: Top trading partners 2017								
Partner	Imports		Partner	Exports		Partner	Total trade	
	Value Mio €	% World		Value Mio €	% World		Value Mio €	% World
World	7,990	100.0	World	579	100.0	World	8,570	100.0
1 India	5,606	70.2	1 India	307	53.1	1 India	5,914	69.0
2 China	596	7.5	2 EU 28	75	13.0	2 China	604	7.0
3 United Arab Eml...	281	3.5	3 USA	68	11.8	3 EU 28	324	3.8
4 EU 28	249	3.1	4 Turkey	42	7.2	4 United Arab Eml...	283	3.3
5 USA	154	1.9	5 Afghanistan	9	1.6	5 USA	222	2.6
6 Switzerland	146	1.8	6 China	8	1.4	6 Switzerland	149	1.7
7 Thailand	94	1.2	7 Bangladesh	7	1.1	7 Thailand	94	1.1
8 Argentina	67	0.8	8 Canada	6	1.0	8 Turkey	72	0.8
9 South Africa	63	0.8	9 Japan	6	1.0	9 Argentina	68	0.8
10 Malaysia	62	0.8	10 Australia	5	0.8	10 Malaysia	63	0.7
4 EU 28	249	3.1	2 EU 28	75	13.0	3 EU 28	324	3.8

World trade: excluding intra-region trade

Top partners: excluding region member states

% Growth: relative variation between current and previous period

In 2017, agriculture contributed to 27.6 percent to the GDP. Approximately 29% of the total land area of Nepal is agricultural land. Rice, wheat, maize, vegetables, lentil and potato are major agricultural productions. Among all the productions, cardamom, lentil, crude materials, tea, fruit juice and ginger are major exports. It is important to note the fact that more than 60% of crops cultivation depend upon the rain in summer monsoon season for water. More investment to develop irrigation facilities would be very fruitful for the agricultural industry. Approximately 74% of the total population are employed on agriculture industry. Despite the fact that more than two-third of population are working on agriculture industry, the import of agricultural products accounted 17.47% of total imports. The increasing brain drain, technological stagnancy and climate change have an eminent impact on the low productivity of agricultural farms. Among others, Nepal mainly imports cereals, rice and paddy, maize, fat and edible oil, fruits and nuts, animal fodder and oil seeds. (Economic Survey 2017/18.)

2.1.3 Socio-cultural factor

Nepal is very rich in diversity of cultures. Despite differences, people have strong sense of tolerance and harmony among the religions, castes, ethnics and language groups. Nepali language, written in Devanagari script, is the official national language of Nepal. Altogether 123 spoken languages are registered in Nepal among more than 80 ethnic groups. Nepali is the most widely used spoken language followed by Maithili (11.7% of total population) and Bhojpuri (6% of total population) respectively. (Census info of Nepal 2011.)

Of the total population 49% are males and 51% are female. The people of age 0-14 years are 39.35%, 15-59 years are 54.15% and 60+ years are only 6.5% of the total population. Out of the total population, the majority of people live in Terai region (50.27%), followed by hilly region (43%) and mountain region (6.73%). Regarding the religious diversity, 80.6% of people are Hindu, 11% are Buddhist, 3.6% are Kirant, 3.2% are Islam and the remaining practice other religions. Life expectancy at birth is estimated 68 years. Only 75% people are literate while primary school enrolment rate is the highest in South Asia (97.2%). (Census info of Nepal 2011.)

Several festivals are celebrated over each year. The biggest and longest festival of Nepal is Dashain which usually falls in September -October. The main day Dashain is called Bijaya Dashami which marks the day of 'victory of truth over evil'. During this time of year, meat consumption reaches the highest peak. Following Dashain, Tihar is another big festival that celebrates 'the love and respect between

brothers and sisters.’ Other major festivals are Chhath and Shivaratri. In addition, there are various other festivals related to different ethnic groups which are celebrated in their own traditions. The consumption of different food items increases as the festivals come by.

Out of 10 UNESCO world Heritage Sites chosen from Nepal, 8 are nominated based on the cultural value they represent. Seven of those are in Kathmandu valley and one in Rupandehi District. The world heritage sites are Kathmandu Durbar Square, Bhaktapur Durbar Square, Patan Durbar Square, Swayambhunath, Pashupatinath, Boudhanath and Changuarayan. The eighth in Rupandehi District is Lumbini – ‘The birthplace of Buddha’. (UNESCO 2019.)

The international community has been heavily involved in Nepal’s Democratic transition and making progress in achievement of Millennium Development Goals (Karkee 2008). Some drawbacks of Nepali society were poverty and discrimination based on caste. However, profound progress has happened during the last decade regarding gender and caste equality. Poverty has decreased to 21.6% in 2015 from 42% in 1996 (UNDP 2015). Education and various awareness programmes continue to be an effective way of eradicating the rudimentary beliefs of Nepalese society. On the contrary, frequent change of the government and mediocre development have led to mass frustration among people in recent years. A significant portion of young population fled out of country in search of work, education and other comforts. The brain drain has become not only economic but a social challenge. This phenomenon, in addition to influence of foreign entertainment industries, has created a high risk of perishing various cultural values in the growing generation. However, various media and networking groups claim that the people are realizing the necessity to conserve the cultures and customs. A happier and progressive society is the innermost desire of Nepali citizens.

2.1.4 Environmental factor

Nepal is divided into three physiographic regions: the lowland (Terai Region), the mid-hills (Hilly Region) and the high mountains (Mountain Region). The altitude of the Himalayan region ranges between 4,877 m. to 8,848 m. It includes eight of the highest 14 summits in the world, which exceed an altitude of 8,000 meters including the world highest mountain Sagarmatha (Mount Everest). The mountain region accounts for about 64% of the total land area, Terai occupies 17%, and remaining 19% is hilly region. The climatic condition ranges from the sweltering heat of the Terai in the lowland to the freezing cold in the Himalayan highland. Because of the extreme variations in altitude and climate, the flora and

fauna of Nepal demonstrate a wide range of diversity. Although the country covers only 0.1% of the earth's land, it is home to over 2% of all flowering plants, 8% of all birds, 1.5% of all reptiles, and 4% of all mammals. Within the space from east to west (approximately 1,000 km) and north to south (approximately 200 km), this small rectangle of topographical and hydrological extremes hosts over 6,500 species of flowering plants, 181 species of mammals, 862 species of birds, and 640 butterfly species. The small country hosts 118 different ecosystems with 35 different forest types. (Parajuli & Pokhrel 2010.)

2.1.5 Technological factor

Nepal has noticeably a long way to go in terms of technological advancement in various fields such as agriculture, education, health, energy and other industries. Since agriculture is a major contributor to the country's GDP, rapid technological advancement in agriculture industry is an urgent necessity. There are diverse ways of how technology can transform the agriculture industry, be it by producing more pest resistant seeds/breeds, constructing efficient irrigation facilities, creating effective machineries for farming, developing accessibility of information to farmers or through other research and development works. Government efforts to boost the agricultural economy have focused on easing dependence on weather conditions, increasing productivity and diversifying the range of crops for local consumption, export and industrial inputs. Solutions have included the deployment of irrigation, import of chemical fertilizers and improved seed varieties, together with credit provision, technical advice and limited mechanization. This has had some effect, yet not impressive. Low level of commercialization in itself is another major drawback for the growth of agriculture industry. (Karkee 2008.)

Land under irrigation increased from 22.07% of agricultural land in 1990 to 54.27% in 2017 (White Paper 2075). Most of the irrigation facilities still do not have all year round water availability. Enhanced water use efficiency is still a challenge mainly due to the lack of awareness and information. The use of chemical fertilizers is essential for optimum production and the right quality & quantity of fertilizers are of critical importance. Several studies suggested that the improved seed alone holds the potential of increasing the yield by 20%. However, the weather continues to determine good and bad years for average farmers. On a national scale, though annual production of both food and cash crops have risen slightly, it is insignificant as compared to the increase in demand. The lack of awareness and effective infrastructure, unavailability of quality fertilizers, the lack of improved seeds and poor knowledge are major problems of the farmers. (Karkee 2008.)

2.1.6 Legal factor

The judiciary system of Nepal, as in other various countries around the world, is independent of the political parties, parliament, and cabinet. The matters related to justice should be handled at courts or other judicial bodies established in accordance to the Constitution of Nepal 2015, other laws, or recognized principles of justice. Other courts and tribunals can be made, according to law, for hearing of special types of cases such military court and other conflict resolution tribunals. Fundamentally, the court system in Nepal has three tiers, namely District court, High Court and Supreme court. A district court is in every district so as to ensure justice to people in their proximity. High court is the next court at province level which has jurisdiction of hearing original and appellate cases. Supreme court is the highest court by rank, however it is not allowed to interfere in the proceedings and decision of any other court or parliament unless they are working outside jurisdictions. The constitution of Nepal 2015 has noted 31 different fundamental rights of every Nepali citizen and provisions to protect them. All the courts and judiciary bodies are responsible to ensure the implementation of rights and duties of/for people, organizations and political bodies under their jurisdiction. (Constitution of Nepal 2015.)

The businesses transactions are subject to tax though there are various goods are services which are tax-exempt based on their importance to people and priority in the economic strategy of nation. Tax can have many forms and values according to the amount of transaction and nature of goods & services. Corporate income tax, VAT, and Personal tax are major categories of taxes. VAT was introduced in Nepal in 1997 to make tax collection more effective in practice. A firm must be registered for VAT if the transactions in the previous 12 months exceed the threshold specified by Inland Revenue Department. The threshold is NRs. 5,000,000 for goods transaction and NRs. 2,000,000 for service (or good and service mixed) transaction. VAT is exempt on several goods and services, specially agriculture related products. The list of VAT exempt goods and services, related to agriculture, is given below. (Inland Revenue Department 2015.)

- Paddy, rice, wheat, maize, barley, millet, pulses, flour, and similar unprocessed materials.
- Green and fresh vegetables, fresh fruits, fresh eggs and similar products (except used in hotels, restaurants and similar organizations).
- Unprocessed cereals, sugarcane, tea leaf, tobacco, cotton, cardamom, jute, oil seeds, soybean.
- Herbs.
- Unprocessed edible oil.

- Goat, sheep, yak, buffalo, cow, bore, pig, rabbit, and similar other animals; their fresh milk and unprocessed varieties.
- Ducks, chicken, turkey, and similar birds; their fresh meat, eggs, and similar uncooked varieties.
- Fresh or dried fish (other than packed).
- Seeds of any plants listed in first group.
- Manure, fertilizer, and soil conditioners.
- Agriculture hand implements.
- Pesticides made mainly for use of crops.
- Agriculture equipment; including tractors.
- Birds and animal feed.

Looking into the history of Nepal, there have been many efforts to enhance the agriculture industry for all small and big stakeholders. Many plans and policies have been made during the terms of various governments. In 1995, the contemporary government formulated a plan called Agriculture Perspective Plan (APP). APP was intended to grow the agriculture industry by 5% annually and to reduce the poverty. It also emphasized the provisions related to irrigation, roads, fertilizers, technology development and the development of agricultural businesses. Due to the lack of coordination and resources, the plan could not meet the target set. A major limitation of the APP was that it could not be effective for small-scale farms, resource-poor families and rural hilly/Himalayan regions. In 2013, the plan was revised to and named as Agriculture Development Strategy (ADS). (Conroy, Joshi & Witcombe 2012.)

The Seed Act came into practice in 1988 to promote the high quality of seeds and their fair trade, both in private and public sectors. The Act controls and facilitates seed management, seed production, new variety registration, distribution and quality monitoring. The National Seed Policy came into enforcement in 1999. It is supposed to strengthen the private sector for developing new crop varieties, multiplying seed species and trade of seeds. Every new seed variety needs to meet the criteria of Distinctiveness, Uniformity and Stability (DUS). The Policy also regulates and monitors Genetically Modified Organisms (GMOs) and transgenic plants. (Conroy et al. 2012.)

In 2004, National Agricultural Policy (NAP) came into force. NAP specially considered the fact that Nepali agriculture industry needs modernization and commercialization. It encourages all stakeholders for sustainability through conservation of natural resources and biodiversity. Moreover, emphasis is

given in developing most appropriate tools to reduce the women's workload, improve labour productivity, and add labour value. Several other acts and policies came into effect during different periods, some of them are listed below: (Conroy et al. 2012.)

- Food Act, 1966
- Consumer Protection Act, 1997
- Export and Import (control) Act, 1956
- Animal Health and Livestock Services Act, 1998
- Environmental Protection Act, 1997.

2.2 Stakeholder Analysis in Agricultural value chain

Stakeholder analysis is one of the most crucial parts of environmental analysis in any business. It is certainly an important aspect for an agricultural farm. Various stakeholders are involved in the agricultural value chain but not all of them have the same degree of power and importance. For a farm to benefit and organize the business in the most effective way, it is necessary to understand the role and significance of other stakeholders. Stakeholder analysis is done at the beginning of a project or before formulating a change in the strategy. In the agricultural value chain, it is suitable to use two tools of stakeholder analysis, namely Actor Analysis Matrix and Importance-influence matrix. Both approaches of analysis are further discussed in the following sections.

2.2.1 Actor Analysis Matrix

Actor Analysis Matrix consists of two key factors called 'Position on decision making' and 'Impact on project outcomes'. First, the stakeholders and their roles are recognized so that a specific number can be given to each stakeholder's position and impact in the value chain. Let us consider that there are total n numbers of stakeholders in the value chain. The 'Position' implies the influence that stakeholder can make on decision making; the most influential stakeholder's position is denoted by number 1, the second most influential stakeholder's position is denoted by number 2 and so on. Eventually, the least influential stakeholder's position is denoted by number n . The 'Impact' suggests the contribution of stakeholders for a successful outcome of product development programmes, number 1 being the highest contributor

and least contributing stakeholder being number n. An Actor Analysis Matrix of the vegetable value chain is presented below for further understanding. The sample is created after a survey at Parvatikunda rural municipality, Rasuwa district, Nepal (Acharya, Amgai, Poudel & Yadav 2018).

TABLE 2. Actor Analysis Matrix (Acharya et al. 2018)

Stakeholders	Primary Activities	Position	Impact
District Agriculture Development Office (DADO)	Technology dissemination	4	1
Rural Municipality Office	Resource allocation	1	3
Farmers	Production	5	4
Local traders	Marketing, sales	7	7
I/NGOs	Advocacy, trainings	2	2
Agrovets	Input supply	8	8
Transporters	Transporting and trading	6	9
Hotels & Restaurants	Buying vegetables for their consumers (tourists and others)	3	5
Trekkers	Taking vegetables to home after trekking	9	6

The matrix indicates that the rural municipality office, followed by I/NGOs and Hotel/Restaurants, has the highest influence in decision making. The farmers who have direct involvement in production have considerably poor influence in decision making. In vegetable development programs (in terms of profitability and productivity) however, District Agriculture Development Office (DADO) can make the biggest contribution followed by I/NGOS, rural municipality office and farmers respectively. The matrix can be used to create a suitable strategy on how co-ordination and co-operation among stakeholders should be handled.

2.2.2 Importance-Influence Matrix

Under the current circumstances, collective effort of stakeholders is necessary to strengthen the productivity, sustainability and profitability of agricultural farms. However, such synergy is possible only if

the stakeholders are satisfied with the benefits they get. Importance-Influence Matrix is a way of classifying stakeholders based on their role and needs, so that the value chain can be strengthened while ensuring benefits to all stakeholders. Importance infers the degree to which the stakeholder's needs and interests are affected by a planned project or activity. Influence, on the other hand, is the power of the stakeholder to affect the planning and implementation of the project or activity. Below is the figure of Importance-Influence Matrix and necessary approach to each group of stakeholders.

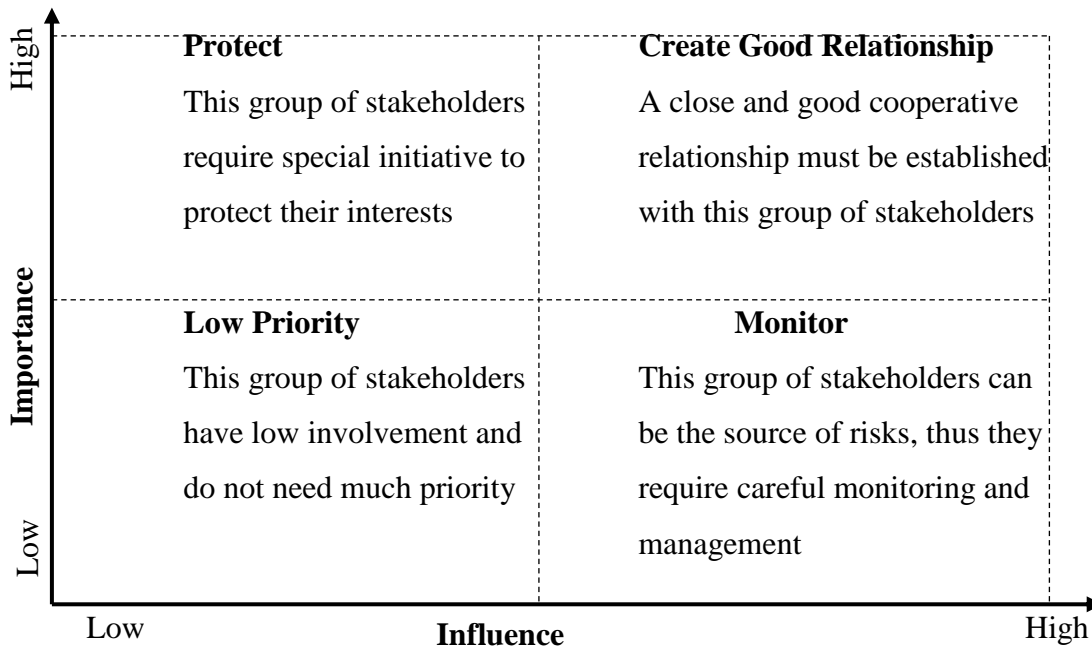


FIGURE 4. Importance-Influence Matrix (Agus 2010)

Generally, in case of the majority of agricultural farms in the country, the highly important and highly influential stakeholders are DADO and rural municipality authority. Farmers, I/NGOs and agrovets are highly important but have low influence. Occasional customers such as trekkers are least important and have a very low influence. Transporters and local traders are highly influential, yet they have low importance. Thus, they need a careful management approach. The matrix is notably beneficial to execute most effective approach and co-operation models with each stakeholder in the value chain (Agus 2010).

2.3 Risk analysis in Agriculture industry

Numerous risks and uncertainties always exist in agricultural farms. The uncertainty of the weather, the unpredictability of biological processes, development of technology, the seasonality of products, de-

mand fluctuation, political and legal changes, and market dynamism are a few of the many factors resulting risks in the agricultural farms. The risks and their extent of impact depend upon climate, production system, soil and other factors of production. Depending on the nature of risks, some can be eradicated while some can only be controlled. Risks from climate change is more of a global concern than of a particular farm, thus needs collective effort to tackle them. Nevertheless, a farm must be prepared to face possible negative impacts of climate change.

2.3.1 The Impact of Climate Change

One of the biggest challenges the earth is facing is climate change. Humankind is responsible for the climate change which has made every living being vulnerable on the planet. Uncontrolled consumption of non-renewable energy, pollution, deforestation and urbanization are major causes of the climate change. According to NASA, the global average temperature increased by 2 degrees Fahrenheit during the 20th century and is predicted to increase by more extent during the 21st century (NASA 2019). Climate change is expected to create dramatic change in weather conditions. Whether it is heavy rainfall, drought, low water level in river or flood, the agriculture industry is bound to be affected. The primary effects of the climate change are increasing temperature, rising sea levels, depleting ice thickness in mountains and unpredictable precipitation. Other impacts of the climate change on living beings are heat related diseases and stress, the emergence of new and old infectious diseases, and natural calamities. During the last decade, a few new diseases had tremendous socioeconomic impact at global scale such as Highly Pathogenic Avian Influenza (H5N1), Swine flu (H1N1), Bluetongue etc. (Khanal 2018). Migration, along with increasing global trade of animals can accelerate the transmission of such diseases.

One of the most severe effects of the climate change is upon agriculture. Global warming can favour several negative impacts. Many researches in Nepal have indicated that it reduces the productivity of maize, sugarcane, potato, lentil, rice and vegetables among others. Global warming is also the reason for the emergence of new diseases in animals. Insect vectors and plant pests become more resistant with the increasing temperature. In Nepal, ticks and helminths are reported to have a noticeable impact on the livestock, both reducing the optimum growth. In the south-eastern part of Asia, helminths are reported to decrease the growth of sheep by 25% and that of goats by 23% to 63%. The total annual loss from infectious animal disease is approximated to be 230 million US dollars in Nepal only (Khanal 2018). Bohara & Shrestha (2016) argue that ticks are important vectors of blood protozoan diseases. Increase

in temperature encourages the tick population growth. Not only do they grow in numbers, but new species of ticks become more dominant and cause new protozoan diseases. On one hand, they cause losses of fertility, body mass and milk production. On the other hand, new protozoan diseases need extra financing for new medication techniques and control measures.

The climate change cannot be tackled by one or few countries in isolation, rather it requires collective effort at a global scale. Countries all over the world are taking climate risk management into consideration. However, most of the approaches are reactive, which focus more on rescue, relief and recovery than prevention. Nepal spends less than 1% of the total budget on the climate change, out of which 96% is allocated to adaptations and only 4% for preparedness (Aryal, Basnet, Giri & Kandel 2018). The amount of expenditure on preparedness should be considerably higher. Fortunately, Disaster Risk and management Act 2017 has recognized the importance of prioritizing proactive approaches over reactive methods. Aryal et al. (2018) suggest four ways governments can mitigate the impacts of climate change on agricultural farms. The first is creating a functional agriculture risk information system and making it easily accessible. The second approach is building agriculture infrastructures such as irrigation, logistics, and storage infrastructures. The third is investing in research and development of alternative seeds and fertilizers, pest control techniques and crop planning provisions. Lastly, the involvement of local governments should be facilitated in policy making so that no local problems are left behind.

2.3.2 Weeds and pests

Depending on the physiography, soil type and the climate of agricultural land, different kinds of weeds and pests can be problematic for farmers. Weeds usually peril crop production by consuming the nutrients and water, producing unwanted chemicals and damaging soil properties. Pests on the other hand can affect both crops and livestock. They can act as a vector for diseases or act as parasite themselves. Both the weeds and pests can have a major negative impact on productivity and costs. Insect pests cause 15% to 20% crop loss annually in Nepal (GC, Pokhrel & Khanal 2018). Helminths, ticks, and mites are common pests on cattle. A broader variety of pests can be found on crops such as flies, beetles, bugs, caterpillars, moth, mite, maggots, thrips, other bugs and microbes. White grub, commonly found in soil, is another pest which usually live in loose soil feeding upon plant roots and tubers.

White grubs are the most common root eating insect found in Nepalese soil. The scientific name of a white grub is Coleoptera Scarabaeidae. White grubs are larvae of chafer beetles. They have white coloured body and a brown capsule on head as shown in the picture below. They normally prefer maize, potato, groundnut, strawberries, legumes, and clovers etc. Hilly regions are prone to the attack of white grubs. In Nepal, they are mostly available in the potato and corn fields. Study in some places indicated reduction in yield by estimated 12-60%. Well fertilized crops can withstand the damage to some extent and weed removal can discourage adult beetles to lay eggs. Frequent watering the crops can help reduce the problem since high water content tend to suffocate them. Moreover, both preventive and curative insecticides are available in market to control the white grubs. (GC et al. 2018.)



PICTURE 1. A White Grub before turning into a beetle (Sparks 2018)

2.3.3 Other risks

Since agriculture is a biological process, affected by several external and internal environmental factors, there are varieties of risks. It is, first, necessary to identify possible risks in order to take measures to handle them. Risks can have impact on production, marketing, financial, legal or HR areas of farm. Some of the prominent types of risks faced by farmers are mentioned in the following table.

TABLE 3. List of agricultural risks

RISK	FACTORS	EFFECTS
Weather risks	variability of rainfall, temperature and other extreme effects of weather	lower production loss of products and income
biological risks	disease, pests, and contamination	low yield loss of products and income
price risks	decrease in market price, volatility of the supply and demand	low revenue high competition
labor and health risks	sickness, death, injury, other occupational hazards	loss of productivity loss of income increased costs
Natural risks	calamities like flood and landslides, droughts, earthquake, strong wind,	high loss of production and products decline in revenue stream loss of assets
policy and political risks	changes in regulations, political disruption of markets and networks, social economical unrest	changes in costs and income change of tax difficulty in market access and analysis security and logistics problems

2.3.4 Risk Management

Noting that various types of risks exist in agriculture industry, it is first essential to assess those risks in order to proceed for management. Risk assessment can be done by identifying and quantifying three different variables namely, Hazard, Vulnerability and Exposure. Once the risk assessment is done with these three prerequisites, appropriate approach of risk management can be formulated.

First, Hazard is a variable that analyses the frequency, severity and spatial extent of the risk. Vulnerability can be considered as an estimation of the impact that risks can make on internal environment of a company taking into account the current ability of the farm to manage the risk. Lastly, exposure is identification of probable livestock, crops and other assets that can be directly affected by the risks. The vulnerability and types of hazard may vary according to the growth stage and season of the crops and livestock. Furthermore, the vulnerability of the hazards is even more complicated to assess due to the fact that they are also related to the type of soil, varieties of crops and livestock, irrigation and waste

management, cultural practices and other local variables. A general way of postulating the risk assessment information is presented in Table 4. It is also important to acknowledge the fact that risk assessment is done through careful assumptions and probabilities. Thus, the risk assessment is done by cautiously interpreting the knowledge, and information suitable for the local area of the farm and time. (Davies, Dohaney, Hayes, Jensen, Johnston, Mitchell, Rovins & Wilson 2015.)

TABLE 4. A risk assessment table (ILO 2013, 13-14)

Risk	Hazard			Vulnerability	Exposure
	Frequency	Severity	Spatial extent		
(Type of the risk)	(How often the risk occurs)	(How bad the risk can affect)	(How big area can the risk affect)	(Impact that the risk can make on internal environment of farm under current conditions)	(What are the resources and products that are prone to the risk)

Once the risks are identified and assessment is done, the next essential step is to manage the risks in order to mitigate or nullify its negative impacts. In addition, risk management is done to ensure that the risks do not arise again in future or at least do not cause as much damage as in previous happenings. The foremost method of risk management should be the avoidance or prevention of the risk in the first place. However, since it is not always possible to avoid risks in real life, generally there are three basic approaches to deal with them, which are Mitigation, Transfer and Coping (Mude, Ouma & Steeg 2011).

Mitigation decreases or limits the possible encounter of risks and also lessens the impacts of possible hazards and related disasters. To prepare for this approach, one must study the type of soil, its properties and the nature of risk creating factors. The types of crops or livestock and their vulnerability should be considered so that preventive actions can be taken. Transfer is the next approach that refers to transferring of potential financial consequences of risks to another party. In case of agricultural farms, the best way to do this is by having an insurance against the most probable risks. In addition, having a good

relationship with the community and stakeholders, risk transferring can be possible to some extent. Lastly, Coping improves the ability of a farm, crop, or livestock to withstand the risks and manage the events in the most resilient and preventive way. For this, it is important to plan and prepare beforehand for the possible hazards. This makes the farm more agile to respond to the events and thus can reduce possible loss. (Choudhary & Sen 2017.)

As the first steps of strategy formulation for risk management, a meaningful goal is set and process plan is created. A meaningful goal is specific, measurable, achievable, realistic, time specific and written. Once formulation part is over, process plan is implemented. The outcomes are then collected for evaluating whether the expected goal has been achieved. In addition, necessary improvements or changes are recognized. The revised plan, with all possible improvements, is then implemented for better results.

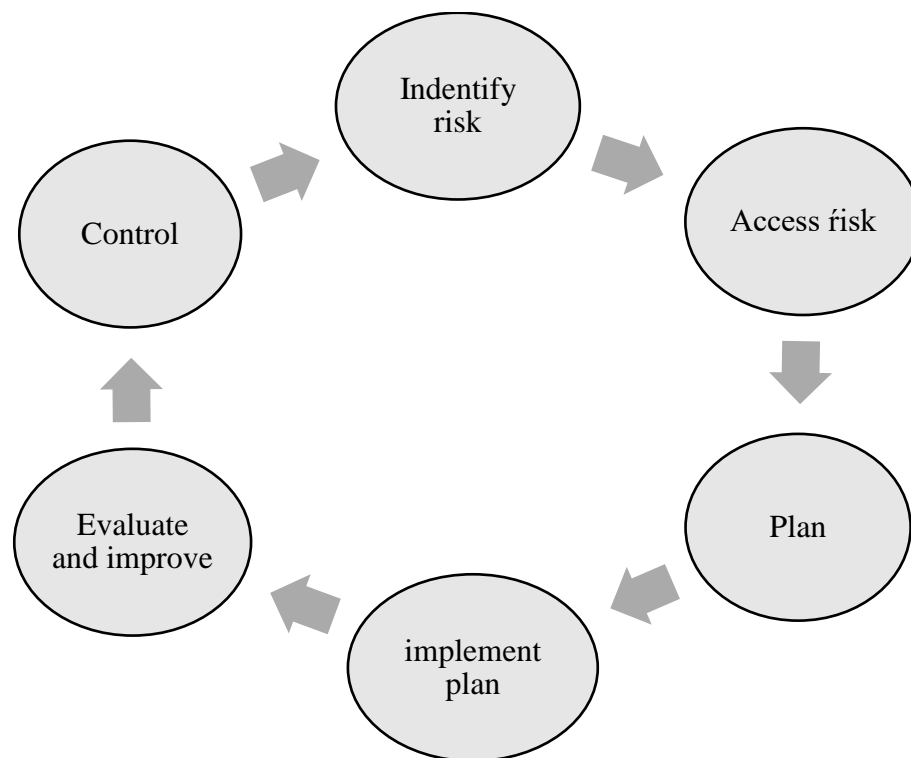


FIGURE 5. Risk Management process (Rowe 2018)

3 BASIS FOR A START-UP OF AGRICULTURAL FARM

This section discusses which factors are important when establishing an agricultural farm and which fundamental attributes can become founding ground for the farm. The first step of a start-up begins with the decision on its products. To decide which products can secure returns, it is essential to analyze the situation of demand and supply. Moreover, the competitive forces existing in the market cannot be neglected. Once the product is finalized other core aspects of the farm must be formulated, which include the mission, vision, values and other major objectives. It is also emphasized how the ethics, sustainability and Human Resource Development (HRD) can act as supporting pillars for the farm's operations. A light is also shed upon the company registration requirements in Nepal.

3.1 Demand, Supply and Competition

The public and private investment on the agriculture industry is very substantial even though the potential markets exist both inside and outside the country (Ghimire 2016). Looking into the export-import data, the production of agricultural products within the country seems largely inadequate to fulfil the existing demand. Furthermore, the demand of agriproducts has an ascending trend annually. It is evident that Nepal has a large sum of trade deficit on food and livestock. It can also be concluded that the competition for market share is not fierce among the domestic agricultural farms. (Trade and Export promotion Centre 2018.)

The only competition an agricultural farm must face is with foreign companies supplying products into Nepal, which implies that if those products can be produced within the country at a reasonable price, the products are virtually assured to be consumed in the market. Another opportunity for an agricultural farm-start up is that it has a significant potential for market expansion and profitability. On one hand a farm can make significant return of investment, while on the other hand it can contribute to the economic progress of the country. However, it is undeniable that the support from government authorities will be essential for a farm to thrive and compete with the foreign companies. The Following table illustrates the export and import values of several agricultural products in 2017. Only the biggest imports of agriproducts are mentioned in the table.

TABLE 5. Import and export of agricultural products in/from Nepal (Trade and Export promotion Centre 2018)

Product	Import (NRs.)	Export (NRs.)
Rice	25,721,362,507	673,164
Maize	12,406,889,007	129,174
Potato	5,596,935,583	118,000
Onion	5,009,714,410	402,390
Garlic	464,788,738	505,726
Tomato	172,816,379	10,291,908
Live goat	2,542,113,780	7,384
Live poultry	193,969,969	-
Meat (Goat and chicken)	82,841,108	-

3.2 Mission, Vision and Goals

As the business continues by adapting to the competitive environment, its resources and strategic plans may change on the way to success. Nevertheless, there are a few core ideals that sustain relatively unchanged in the course of time. Those ideals are called Mission, Vision, and Core values. A company's core ideals are the pillars to its identity. They act as ground to all strategic and operational decision-making processes throughout the company's journey. Let us remember our case agricultural farm in Nepal and try to formulate those attributes.

The vision of a company is relatable to the ultimate dream or destination of an individual. The vision is what an organization desires to be in future and what it wants to achieve. It is the future oriented picture of an organization which should have the power to strengthen the organizational culture, increase the

motivation of every employee, and communicate dream of the organization among stakeholders (Populova 2014). It is reasonable to say that the vision translates the reason for organization's existence. It gives the direction and sense of purpose to the firm. In strategic planning, the vision acts as a reference point in future which indicates where the organization is heading and why (Populova 2014). An example of a vision statement for the case agricultural farm is stated below.

Our Vision: To be a leading and vibrant agricultural farm by 2028 and contribute to dynamic growth of communities through awareness & assistance.

The mission of a company tells why it does what it does. It represents the purpose of existence. The mission statement of a company illustrates why it is different than others and what it does to achieve the vision it aspires (Populova 2014). The mission statement is important since it provides the sense of purpose and motivation to stakeholders. An example of a mission statement for the case agricultural farm is stated below.

Our Mission: Your health and happiness are our priority thus we provide the healthiest products at affordable price for everyone. We are glad to contribute in progress of societies by taking part in social and environmental developments.

The vision and mission are broad and far-reaching; therefore, a company divides them into several steps called goals. Achieving each goal means one step closer to the vision. A series of goals need to be accomplished before vision is finally realized. If the goals still seem big or broad to be accomplished, then a roadmap is created. The roadmap is a series of objectives that need to be fulfilled to achieve a goal. Several studies agree that the objectives must be SMART. SMART stands for Specific, Measurable, Achievable, Rewarding, and Time-specific. (Edwards 2014.)

For our case agricultural farm, examples of goals are listed below.

Our Goals:

- Production of healthy and organic products,
- Conservation and enhancement of environmental quality
- Efficient use of natural resources,
- Effective and efficient production through implementation of advanced technology,

- Continuous process-improvements and annual market growth at the rate of at least 8 percent,
- Enhancing the quality of the life of farmers and society as a whole,
- Starting from the 5th year, contributing at least 5% percent of profit for Socio-economic developments in rural areas,
- Waste management through re-use and recycling,
- The transparency of business transactions.

3.3 Core values and Sustainability

Core values are the central principles and beliefs of a company that guide its decision makings. They reflect the company's culture. The core values represent the moral and ethical philosophy that all stakeholders are committed to. Irrespective of time and situations, these values remain unchanged. (Balanescu & Bratianu 2008.)

For our case agricultural farm, below are examples of some core values.

Our Core Values:

- We uphold the virtues of integrity, honesty, accountability, and fair play
- We carry out our duties with commitments and dedication
- We put all our effort to ensure the availability of food for poor individuals and families
- We treat all humans and animals with humanity and empathy
- We stand for pursuit of excellence
- We are open to build trust and relationships with all stakeholders
- We support, conserve, and enhance the socio-cultural and environmental resources

Sustainability can be defined as an approach of continuous success (in terms of growth and profitability) and contributing to the economic, environmental and social developments. In agriculture farms, sustainability can be realized by producing organic products, using less chemicals, using water efficiently, promoting biodiversity and other ways of corporate social responsibility. Other important ways for sustainable farming are using organic fertilizers, crop rotation, disease resistant seeds/breeds and efficient resource utilization. The importance of sustainable agriculture is undeniable because people are becoming

more health and environment conscious. Sustainability in agriculture yields three major benefits. One is human health benefits, another is environment conservation, and the last is encouragement to people for creating better/progressive society. (Pretty 2007.)

3.4 Basics of Company Registration

Companies are different based on their profit motive and liability upon shareholders. Non-profit organizations are established with the motive to serve than to make profits. In unlimited liability companies (public or private), the shareholders are liable for all the credits in case the company fails to discharge. In case of companies where liability is limited by shares, the shareholders' liability is limited to the amount unpaid on the shares they hold in case of insolvency. Moreover, if the company is limited liability of guarantee then the shareholders are liable to pay a certain amount of money, as agreed beforehand, in case of insolvency. The registration of company in Nepal is guided by The Companies Act 2006. The Act has also specified the documents requirements and registration fees for incorporating a company. Based on the Companies Act of Nepal (2006), the types of companies and how they can operate are described below. (Companies Act of Nepal 2006.)

3.4.1 Private Limited Company

A Private Limited Company is established by 1 to 50 shareholders. No minimum capital is required to start such a company. The liability of the shareholders is limited by shares. The shares are not allowed to be sold publicly. The company's Article of Association must mention the face value of the shares and when meetings of board directors should be held. The Companies Act requires the company to add 'Private Limited' at the end of the company Name. (Companies Act of Nepal 2006.)

3.4.2 Public Limited Company

Similarly to a Private Limited Company, the shareholder liability in a Public Limited Company is also limited by shares. The Companies Act requires at least 7 shareholders and promoters for a company to register as a Public Limited Company. The company's capital should be at least 10 million Nepalese

Rupees. The board of director consists of 3 to 11 directors, who shall conduct meeting of board of directors at least 6 times in a year. The face value of a share should be minimum of 50 NRs and the value must be divisible by 10. Such a company is required to add 'Limited' at the end of its name. (Companies Act of Nepal 2006.)

3.4.3 Sole Proprietorship

Sole proprietorship is the simplest form of a company. In this type of company, the ownership belongs to a single person who controls the decision making. A sole proprietorship is not a separate legal entity from its owner. It operates under the name of the owner or a fictional name. In case of the latter, the fictional name is only used for business operations but does not imply a different lawful identity from the owner. The owner signs the business documents and bears unlimited liability for all the debts. One needs to be careful before establishing this kind of company because the owner bears all risks as well. The proprietor has unlimited liability to overcome or compensate any business-related accidents. (Companies Act of Nepal 2006.)

3.4.4 Partnership

A Partnership is formed when two or more persons jointly decide to establish a company. They are subject to unlimited liability for the company's debt. A benefit of this kind of company is that the risk is shared upon the owners. However, the possibility of conflict lies in business decisions. A partnership can be complicated due to the difficulty in transfer of shares. (Companies Act of Nepal 2006.)

3.4.5 Joint Stock Company

A joint stock company is considerably bigger in structure and costs. Thus, such a company is formed by a large number of investors (shareholders). Every investor owns a portion of the company according to his share/stock. The shareholders can publicly transfer their ownership to any other person. Due to the large number of shareholders, a joint stock company hires a different management team than the owners. The liability of a shareholder is limited to the extent of uncalled or unpaid shares held by him/her. (Companies Act of Nepal 2006.)

3.4.6 Non-profit Organization

A non-profit organization requires at least one to five members to register as a legal entity. It does not have any shareholders and does not require a minimum capital for the establishment. The purpose of such an organization must be to benefit public in certain ways. The non-profit organizations are usually tax exempt on its incomes, but they must pay the employment taxes and should not violate the labour rights. (Companies Act of Nepal 2006.)

3.4.7 Cooperative Organizations

A minimum of 25 members is required to register a cooperative organization. This type of organization is service motive than the profit. The members establish a cooperative organization either to meet their common needs and desires, or to protect some religious, cultural, social and moral values. The organization practices a voluntary or open membership method and the members have equal voting rights. The companies Act does not allow such organization to conduct any credit transactions, rather only cash transactions can be made. It requires the organization to add 'Cooperative Limited' after its name. (Companies Act of Nepal 2006.)

3.4.8 Documents required for company registration

The Companies Act of Nepal (2006), defines the list of documents that are necessary to register a company. The list of documents is mentioned below.

- The memorandum of association of the proposed company,
- The articles of association of the proposed company,
- In the case of a public company, a copy of the agreement, if any, between the promoters prior to the incorporation of the company,
- In the case of a private company, a copy of the consensus agreement, if any,
- Where prior approval or license has to be obtained from anybody under the prevailing law prior to the registration of a company carrying on any particular type of business or transaction pursuant to the prevailing law, such approval or license,

- Where the promoter is a Nepalese citizen, a certified copy of the citizenship certificate and where a corporate body is a promoter, a certificate of registration of incorporation, decision of the Board of directors, regulating the incorporation of the company and major documents regarding incorporation. (Companies Act of Nepal 2006.)

3.4.9 Fee for registering a Public Limited Company

The Companies Act of Nepal (2006) has made different fee provisions for registering public and private limited companies. In both cases, the registration fee can be different according to the company's authorized capital. The provision of the registration fee for a public limited company is mentioned in following table.

TABLE 6. The registration fee for a public limited company (Companies Act of Nepal 2006)

Authorized capital (In NRS.)		Registration fee
Lower limit	Upper limit	
-	1,00,00,000	15,000
1,00,00,001	10,00,00,000	40,000
10,00,00,001	20,00,00,000	70,000
20,00,00,001	30,00,00,000	1,00,000
30,00,00,001	40,00,00,000	1,30,000
40,00,00,001	50,00,00,000	1,60,000
50,00,00,001	-	1,60,000 plus NRS 3,000 for every added NRS 1,00,00,000s

3.4.10 Fee for registering a Private Limited Company

The fee provision for registering a private limited company, according to Companies Act of Nepal (2006), is mentioned in TABLE 7.

TABLE 7. The registration fee for a private limited company (Companies act of Nepal 2006)

Authorized capital (In NRS.)		Registration fee
Lower limit	Upper limit	
-	1,00,000	1,000
1,00,001	5,00,000	4,500
5,00,001	25,00,000	9,500
25,00,001	1,00,00,000	16,000
1,00,00,001	2,00,00,000	19,000
2,00,00,001	3,00,00,000	22,000
3,00,00,001	4,00,00,000	25,000
4,00,00,001	5,00,00,000	28,000
5,00,00,001	6,00,00,000	31,000
6,00,00,001	7,00,00,000	34,000
7,00,00,001	8,00,00,000	37,000
8,00,00,001	9,00,00,000	40,000
9,00,00,001	10,00,00,000	43,000
10,00,00,001	-	43,000 plus NRS 30 for every added NRS 1,00,000

3.5 Human Resource Development/Management (HRD/M)

HRD mainly focuses on the development of employees' intelligence, capabilities and social skills (Gibb 2013). In every company, employees' motivation and sense of belonging are significant for the effective performance. In an agriculture farm, a farmer's well-being and motivation is manifested in his work and it eventually creates better outcomes. According to the size and activities of the farm, the number of required employees can be different. Usually, 3-5 persons can manage a farm all year round, except in

planting and harvesting seasons when more workers need to be hired. Employees must be provided with necessary trainings including occupational health and safety measures. Employees must be provided with the information about how to become effective and efficient in their job functions. Each worker should be trained for skills to work in different functions of the farm and at different levels of crop production process. This approach can be helpful to avoid human risks as well as to keep employees out of monotony. A culture should be developed where constructive feedbacks are exchanged and rewards are given according to performance. Trust, however, is one of the most important things to be worked on, so that the sense of belonging and empathy can flourish among employees.

As a part of human resource management, all employees must be acquainted to the farm's core ideals. Sustainable growth of a farm is directly linked to the commitment of workers which they have for the farm's vision, mission and values (Armstrong 2014). Therefore, time, effort, energy and dedication are required to develop the shared mission and vision for the farm. Simply reading the mission and vision statements or printing them out cannot necessarily convince employees to accept them or to act towards achieving them. First, the employees at higher positions such as managers and owners must show commitments to the core ideals. Then every employee must be talked through the significance of those statements, as many times as necessary, so that they will believe in the seriousness of those ideals and act in integration with business strategy. HRM, thus at no cost, should be neglected if one intends to enhance the productivity, quality, and performance of the farm. Michael Armstrong (2014) suggests how HRM impacts organizational performance as presented in the figure below.

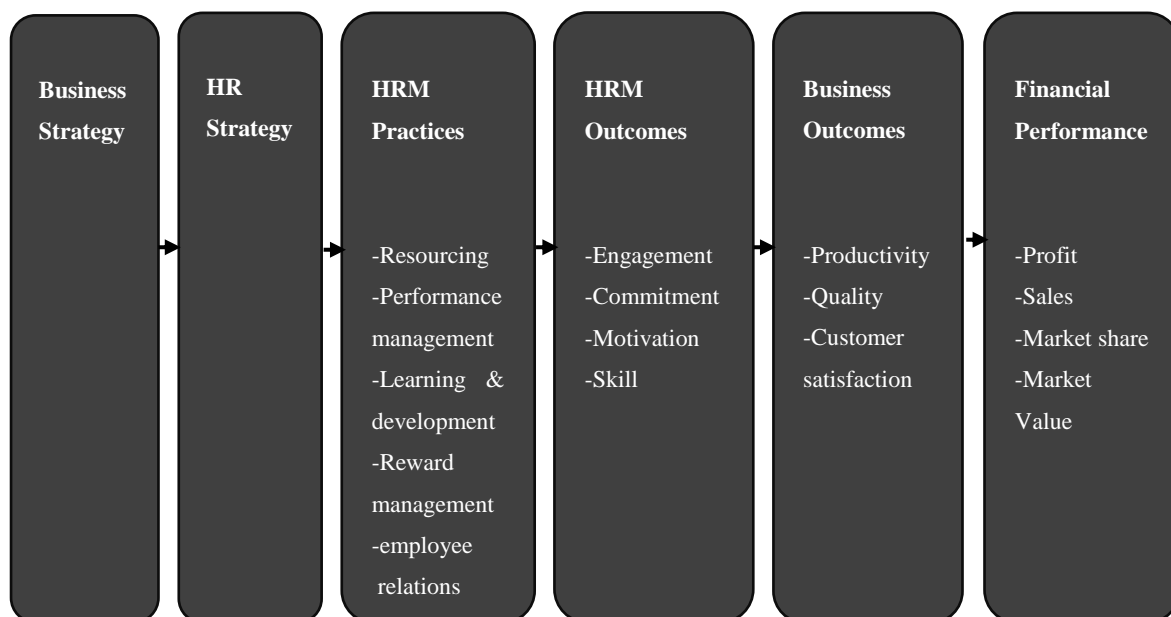


FIGURE 6. The impact of HR on organizational performance (Armstrong 2014, 143)

4 AGRIPRODUCTS PRODUCTION AND LOGISTICS

Products need to be chosen carefully based on physiographic location, soil, climate and available resources. Another important factor for determination of products is demand statistics in the market. The optimum production of quality products must be the primary goal of a farm. It is undeniable that several factors contribute to the production process of agriproducts. The use of water and fertilizers can play a tremendous role on crop yields, while health management is equally essential for both animals and crops. Other aspects of production are described in the following sections.

4.1 Procurement of seeds or breeds

As discussed earlier, the selection of the right kind of seed or breed can increase the productivity significantly. Thus, finding the most appropriate seed or breed is very crucial for the farm's success. Most of the seeds and breeds used in Nepalese agriculture industry are indigenous to respective areas (Dangol, Gauchan, Gautam, Ghimire, Joshi, Khatiwoda, Poudyal, Sapkota, Sharma & Sthapit 2018). Normally they are grown and stored in locality. Every year, after harvesting the crops, some of the harvest is separated and stored as seed for the next farming cycle. However, the trend of using new breeds and hybrids has also been rising in recent times. There are many modern varieties of breeds which can increase the productivity of a farm in two ways. They can yield bigger output and/or they are more resistant to pests and weeds. The harvested crop from hybrids and GMOs, however, is not recommendable to be used again in the next farming cycle since they can be very prone to diseases, soil deformation and even no yield at times. Buying seed for every farming cycle can be costly. It is also reported that after growing the so called modern seeds for a few years, the fertility of soil plunges dramatically. Nevertheless, if one intends to use modern varieties, a thorough research is indispensable. Seeds and cattle breeds must be bought only from the authorized sellers, after careful consideration of their sustainability in future.

National Seed Company Limited (NSCL) is the main seed and breed supplier in the public sector. Other companies and cooperatives, registered under District Seed Self-Sufficiency Programme (DISSPRO) of DADO, also contribute to seed/breed supply in the public sector. The private sector's involvement in seed trade has been increasing in recent years. Acting as bridge between the seed producers (public/private) and customers, they facilitate the availability of seeds to farmers at a local level. National Agricul-

ture Research Council (NARC), Agriculture Botany Division and Agronomy Division take responsibility for the development and production of new varieties of seeds. In case of animal farming, the breeding is different from place to place, which is discussed later. (Conroy et al. 2012)

4.2 Aspects of Crop Production

Crop production can be affected by different factors, such as physiographic location of the farm, climate, agricultural inputs, farming systems and several other environmental factors. Considering all those factors, most appropriate approach should be implemented so that the crop production is significant both in quality and quantity. Different crops require different climatic and soil conditions for growth, thus understanding climate is an essential factor to establish any agricultural farm. S.N. Vaidya (2000) suggests that Nepal can be divided into five basic climatic zones based on altitude and temperature.

TABLE 8. Climatic Zones of Nepal (Vaidya 2000)

Temperature Zone	Altitude	Mean annual temperature, C°	Temperature regime
Sub-tropical	<1000 m	20-24	Hyperthermic
Warm temperature	1000-2000 m	15-20	Thermic
Cool temperature	2000-3000 m	10-15	Mesic
Alpine	3000-4000 m	3-10	Cryic-frigid
Arctic	>4000 m	<3	Pergelic

4.2.1 Nature of soil

As discussed earlier, the properties of soil are the key determinant factor in crop production process.

Basic properties of soil are listed below.

- Soil Colour
- Soil texture
- Soil depth
- Water holding capacity
- Nutrient dynamics
- Buffering capacity. (Jaishy 2000.)

Soil colour is used by many farmers as a distinguishing criterion. The colour of soil can relate to the age of soil, carbon content and the origin of the soil. At higher content of carbon in soil, the soil colour is darker, the moisture and cation-holding capacity of soil are higher and the structural stability of the soil aggregates is greater. Similarly, a higher content of Iron (Fe) gives more reddish colour to the soil. The common system of soil colour classification in Nepal is presented in the table below. (Shah 2000.)

TABLE 9. Local soil colour classification in Nepal (Shah 2000)

Local Colour Classification	Munsell Soil Colour Chart
Kalo mato (black)	10 YR 3/1-4/1 - dark greyish brown – very dark greyish brown
Rato mato (red)	2.5 YR 4/6-5/6 - red
Haluka rato mato (light red)	5 YR 5/6-6/6 – yellowish red – reddish yellow
Khairo mato (brown)	7.5 YR 4/2-5/2 – brown – dark brown
Phushro mato (grey)	10 YR 5/1-5/2 - grey – greyish brown
Kharani mato (light grey)	7.5 YR 7/10 YR7/7 – light grey
Jogi mato (yellow)	10 YR 6/6-7/6-8/8 – brownish yellow - yellow

According to Shah (2000), soils with dark greyish colour have the most suitable P^H at high elevation places while the light grey-yellowish soils have the lowest P^H irrespective of elevation. Red soils are generally considered to have lower phosphorous levels. Similarly, light greyish to yellowish soils have the lowest Cation Exchange Capacity (CEC) and exchangeable Calcium (Ca). Table 5 illustrates the fact further. CEC is a measure of negatively charged particles available in soil which can bond with the positively charged particles available in fertilizers so that the new compound can be nutrient for plants. Examples of positively charged particles are K^+ , NH_4^+ , Ca^{++} , Na^+ , Mg^{++} , Mn^{++} , Fe^{++} , Zn^{++} , and Cu^{++} etc. (Shah 2000.)

TABLE 10. Indigenous colour classification and corresponding chemical conditions (Shah 2000)

Soil colour	Land use	Elevation (m)	P^H	Avail P (mg/kg)	CEC (meq/100g)	Exch. Ca (cmol/kg)
Dark greyish	Khet	>1200	5.8	19.6	14.8	10.1
Red-reddish yellow	Khet	>1200	5.4	5.6	12.3	5.1
Light grey – yellow	Khet	>1200	5.0	28.2	9.4	4.4
Dark greyish	Khet	<1200	5.1	84.3	6.2	2.5
Red – reddish yellow	Khet	<1200	5.6	10.8	13.8	5.8
Light grey – yellow	Khet	<1200	4.8	34.4	9.1	3.9
Dark greyish	Bari	>1200	5.2	36.6	10.9	5.6
Red – reddish yellow	Bari	>1200	4.9	13.3	14.3	4.1
Light grey – yellow	Bari	>1200	4.7	37.1	7.9	3.2
Dark greyish	Bari	<1200	4.7	14.1	12.1	3.5
Red – reddish yellow	Bari	<1200	4.8	7.2	12.4	3.1
Light grey - yellow	Bari	<1200	4.6	18.1	8.6	2.8

The texture is next important characteristic used by farmers to differentiate the soils. The texture is decided upon the size of soil particles and particle arrangement/adhesion in soil aggregate. These properties indicate the soil's ability to supply water, air and nutrient for root development. The texture of the soil is a stable property, which implies that the particle size cannot be changed unless mixed with other types of soils. In comparison to light textured soils, usually the soils with heavy texture need more effort in ploughing, digging or other soil related activities. Table 5 presents the Local soil classification system in Nepal, based on texture. Knowing the texture of the soil is very important for crop selection and the estimation of water/nutrients requirement. (Shah 2000.)

TABLE 11. Local soil texture classification in Nepal (Shah 2000)

Local name	USDA texture class
Pango	Silty loam / Silt
Balaute	Sand
Domat	Loam
Balaute Domat	Sandy loam
Balaute Chimte	Sandy clay loam
Domat Chimte	Clay loam
Chime	Clay
Gagren	Gravelly
Masino	Fine
Chimte	Very fine (clay)

Soil depth is also important property to be considered. The more depth soil has, the higher is the moisture retention capacity. Moreover, deeper soils facilitate larger root distribution in soil thereby allowing plants to absorb more moisture and nutrients. The darker colour and finer particles are properties of the soil with higher water holding capacity. (Shah 2000.)

4.2.2 Fertilizers

The management of fertilizers is one of the most significant aspect of crop production. For an optimum growth of crop, the right combination of organic and chemical fertilizer is essential. Organic fertilizer is preferred since it has reduced health effect, environmental impact and soil degradation. In addition to organic matter, soil has various nutrient dynamics necessary for plant growth, such as Phosphorous (p), Nitrogen (N), Potassium (K), Calcium (Ca), Boron (B), Zinc (Zn), Iron (Fe), Manganese (Mn), Molybdenum (Mo), Copper (Cu) and Sulphur (S) etc. The deficiency of any of the aforementioned elements leads to poor crop yield while excess can result in harmful effects on human health. Every crop has its unique nutrient requirement and therefore nutrients availability in soil has to be tested before the crop production. Out of all other elements, phosphorous, nitrogen and potassium are needed in higher proportion. General analysis of soil based on nutrient proportion is illustrated in the following tables. (Subedi 2000.)

TABLE 12. Soil analysis categorized as low, medium and high (Jaishy 2000)

Nutrient/pH	Low	Medium	High
N (%)	<0.1	0.1-0.2	>0.2
P kg/ha	<30	31-55	>55
K kg/ha	<110	111-280	>280
pH	Acidic	Neutral	Alkaline
	<6.0	6-7.5	>7.5

TABLE 13. Organic Matter rating in Terai and Hilly Region (Jaishy & Subedi 2000)

Criteria	Terai	Hill
Very low	<0.75	<1.0
Low	0.75-1.5	1.0-2.5
Medium	1.5-3.0	2.5-5.0
High	3.0-5.0	5.0-10
Very high	>5.0	>10

The data implies that the total fertilizer demand in Nepal is approximately 586 thousand tons a year, out of which National Fertilizer Company Limited solely imports and distributes approximately 200 thousand tons per annum. Private importers and distributors have also been increasing in number in recent years. Looking at the current fertilizer use rate in Nepal, the statistics of the use ranges from minimum of 19 kg/ha to 195 kg/ha. Fertilizer use in Nepal is considerably lower in comparison to other agricultural states. Fertilizer consumers, especially in rural parts, often complain about the shortage of fertilizer or the deficiency of a certain nutrient in fertilizers. Many agricultural fields in rural areas are found to be deficient of phosphorous. One must, therefore, have caution to handle such problematic situations for proper farm management. (Joshi, Conroy & Witcombe 2012.)

Supplier relationship management and inventory management are simple tools to eliminate the risks of a fertilizer shortage. As mentioned before, testing the nutrient content of the soil is very important, so that particular types of fertilizers can be added in necessary proportions. The P^H of the soil can also indicate which chemicals are highly probable to be found as nutrients (Subedi 2000). Table 9 presents such phenomena.

TABLE 14. Optimum P^H range for different nutrients availability (Subedi 2000, 44)

Nutrients	Optimum P ^H range
N, K, S	5.5-7.5
P	6.5-7.5
Ca, Mg	>6.5
Fe, Cu, Zn, Mn	5.5-7.0
B	5.0-7.0
Mo	5.5-7.0

The most important aspect of fertilizer management should be accessing to the sufficient amount of organic fertilizer. Organic fertilizers can be bought (cheaper than chemical fertilizers) or even produced. Green manure, cattle dung and composts are common organic fertilizers. Lately, technologies have been developed for rapid composting of organic substances. Maskey (2000) argues that 5t/ha of poultry manure, 20t/ha of compost or 100:40:30 kg/ha of NPK fertilizer yield similar results in crop productivity.

In addition to organic and chemical fertilizers, biofertilizers are an effective way to increase crop production. These eco-friendly micro-organisms can live in rhizosphere or inside the plant. The functions of biofertilizers include N fixation, solubilizing P and synthesis of other growth promoting nutrients.

Rhizobium, Azospirillum, Azotobacter and Blue Green Algae are commonly used biofertilizers. Earthworms are another effective method of enhancing the soil fertility. They can be cultured and left in the fields. Earthworms need moisture to survive. Chemical fertilizers and pesticides might, however, have a negative impact on their survival. (Bhattacharjee, Bhattacharyya, Goswami & Mahanty 2016.)

Rhizobium is usually used in legume crops. Azotobacter is used for crops such as maize, wheat, cotton, potato, mustard, and vegetables. Azospirillum is normally used for millet, maize, sugarcane and wheat. Blue Green Algae, a type of cyanobacteria, helps nitrogen fixation in paddy crops. Pantoea agglomerans and Pseudomonas pitida are phosphate solubilizing bacteria. (Malherbe 2014.)

4.2.3 Pesticide management

Pests are one of the major problems agricultural farms need to face. Timely prevention or cure of pests is essential for the desired extent and quality of crop production. Various types of pesticides are used in crop production all over the world. Baits and poisons are also used for bigger animals. However, one needs to be careful to use just the right dose of pesticide. Inadequate use may not be effective, while excess use may leave residues in the yield which eventually deteriorates the human health. The excess use of pesticide can, also, cause environmental pollution and kill several beneficial microorganisms. The use of biopesticides is safest approach regarding human health and environmental impact. WHO has classified pesticides into five categories based on their potential hazard on human health. Pesticides belonging to Ia class are banned in Nepal while the trade and use of Ib class pesticides are strictly regulated (Adhikari 2017).

TABLE 15. WHO classification of pesticide based on hazardous potential (WHO 2009)

WHO Class	Hazard potential
Ia	Extremely hazardous
Ib	Highly hazardous
II	Moderately hazardous
III	Slightly hazardous
U	Unlikely to present acute hazard

Pesticide trade and use in Nepal is regulated by Pesticide Act 1991 and Pesticide Regulation 1993. Pesticide Regulation and Management Division (PRMD) under Plant Protection Directorate is responsible for registering, monitoring and managing pesticide trade in central level. Similarly, 75 Pesticide Inspectors in district level are authorized to import, monitor, and manage the pesticide supply and distribution at district level. Private companies, institutions and retailers are also eligible to register under PRMD so that they can be licensed to trade pesticides. Under Pesticide Act and Regulation, a total of 9954 licenses had been provided by 2017. (Adhikari 2017.)

According to Plant Quarantine and Pesticide Management Centre, also known as National Plant Protection Organization Nepal (NPPONepal), 219 private companies have been registered under PRMD as pesticide importers. NPPONepal provides detailed information on the types of pesticides registered in Nepal and guidelines to use them. The following table presents the numerical statistics of pesticide varieties registered in Nepal by 2017. (NPPONepal 2017.)

TABLE 16. Types of Pesticides registered in Nepal (NPPONepal 2017)

Pesticides	Common Names	Trade Names
Insecticide	52	1405
Acaricide	6	27
Fungicide	40	648
Bactericide	1	15
Herbicide	22	350
Rodenticide	2	33
Molluscicide	1	2
Biopesticide	12	90
Herbal	3	6
Total	139	2576

Pesticide application process begins with the identification of existing or potential pest. Once the pest is identified, its biological nature is studied, such as activities, life-cycle, needs and dislikes. Then particular pesticide is applied in order to prevent or eradicate them. While doing so, timing, water abundance and frequency are in the key role to achieve the most effective results. Moreover, the application method

is crucial since some pesticides are soil-applied (applied in soil, before or after pest emergence) while some are foliar-applied (applied on leaves or stems, before or after pest emergence). Based on the effectiveness of the pesticide against the number of pest species, they can be divided into two basic categories, namely narrow-spectrum and broad-spectrum. Narrow-spectrum pesticides are effective against one or a few species while broad-spectrum pesticides are effective against a larger number of species. (Kentucky Pesticide Safety Education Program 2016.)

Based on the timing of use, the area of application, and functions, different types of pesticides can be categorized into different groups. For example, the herbicides can be separated into two categories based on their area of application. The Soil-applied herbicides are put into soil before or after the germination of weeds. Foliar-applied herbicides, on the other hand, are applied on leaves or stems of the weeds once they are germinated. Likewise, fungicides can be divided into three categories based on their function. First, the protectant fungicide is applied on leaves or fruits before fungal infection. It stops the germination of fungus. Second, the curative or eradicant fungicide is applied on already existing fungus. It stops further development of fungus and eventually kills it. Lastly, the uni/multi-site fungicide is type of fungicide that inhibits or disables one or more specific function of fungal development. This kind of fungicide is used either because the total eradication of fungus is unnecessary or because the manipulation of fungus can be beneficial. (Kentucky Pesticide Safety Education Program 2016.)

Insecticides are the most widely used among all pesticides. Based on the mode of action, they can be divided into numerous categories:

- Direct Contact - some of the insecticides work when they are applied directly upon the pests by spraying over them.
- Secondary Contact - these insecticides are applied on the plant; they work when pests crawl over or land on the treated surface.
- Ingestion – such insecticides are effective when pests eat the treated surface (leaf, stem, pollen etc.).
- Repellent – these insecticides repels pests from staying or feeding the plant tissues.
- Fumigants – such insecticides also repel the pests; they are in the gas form and usually used in soil.
- Pheromones – pheromones are chemicals used by insects for communication, the use of such chemicals can confuse or distract the pests; for example, the use of sex pheromones make insects

look for a male or female partner and hence confuse them. (Kentucky Pesticide Safety Education Program 2016.)

4.2.4 Water resource management

Water is one of the most crucial factors of production in crop agriculture. The availability of sufficient water is indispensable for optimum production. However, it is advantageous only if the water is used in an effective way. Too little or too much use of water can both result in a negative effect on yield. Depending upon the type of soil, the water holding capacity can be different. Also, different crops need different level of soil humidity for growth. Therefore, the nature of soil, climatic condition and the type of crop need to be studied so that the use of water is both effective and efficient.

Nepal is the second richest country in the world for water resources. Agricultural lands acquire water either through rainfall or through water canals from rivers. Less common sources are ground water from tube well and lakes. One of the problems is that the water is excess during the monsoon season while it is scarce during summer. Solution can be water harvesting techniques. In addition to water harvesting, there are different types of irrigation techniques for efficient water management. There are basically three ways of irrigation, namely surface irrigation, drip irrigation and sprinkler irrigation (Bjorneberg & Sojka 2005).

Surface irrigation is the oldest method of irrigation. In this approach, water is brought to the field from water canals or pipes and water slowly covers the whole surface or furrows. This method is considered to be inefficient since water is needed in large amount and it can be wasted. However, the benefit is that less manual labour is required. The second method of irrigation is drip irrigation. In this approach, water is led to plants through small pipes. Around every plant root, the pipe has a small hole through which water drips out. This method is considered more efficient than the traditional surface irrigation technique. The drip irrigation method prevents fungal infections due to less/no water contact to flowers, leaves and stems. Moreover, weed growth is also controlled since water is supplied only to plant roots but not elsewhere. The third irrigation method is the sprinkler. As the name suggests, water is sprinkled over the vegetation with the help of a sprinkling machine. This method can be effective for both big and small fields. This method is water efficient and distributes water evenly on the field. All irrigation methods are proven to increase the crop yield. Thus, any start-up must consider using an appropriate irrigation technique for sustainable water management. (Bjorneberg & Sojka 2005.)

4.3 Aspects of Animal Farming

Animal farming is equally important half of agribusiness, crop production being the first half. The demand of meat and other animal products has been increasing in Nepal and outside. Poultry, goats/sheep, buffaloes, fish and pigs have the highest demand in the meat market. Milk, fibres, and eggs also have a high demand. Other than that, bees, silkworms and equines are common areas of animal farming. (Nepal Foreign Trade Statistics 2017/18.)

Animal farms are a major source of organic manure for crop production. In many rural areas, animal manure is processed for biogas for household purposes. Beef is virtually banned in Nepalese society since cows have a major religious significance and it is Nepal's national animal. Similar to crop production, animal farming is also affected by climatic conditions, infrastructure, diseases, breeds, and fodders. It is to be noted that animal behaviour must be studied before growing them in the farm.

4.3.1 Shelter

Shelter management is very important for animal farming. Different types of livestock need different kinds of shelters. Moreover, the shelter should be suitable according to climatic conditions such as monsoon, summer, winter etc. The temperature of the environment can affect the growth of animals. Thus, livestock shelter should be built and managed according to the physiographic location of the farm and respective climate. Proper shelter is particularly important to save the animals from extreme cold and heat stress. A good shelter has features such as enough space for moving, feeding area, controlled aeration, proper bedding and sanitation. A good shelter creates advantage of a better growth, increased productivity and reduced sickness/mortality.

All shelters, irrespective to animal types, must have a functional system to manage wastes and manures. There are technologies available for conducting various functions as required in a production system. Machines can be used to filter water, supply feed and water, cut fur, collect manure, collect eggs or milk the bovines. Depending on the requirement, they can be manually controlled or programmed for autonomous performance. Such machines can be installed as an integrated part of the shelter for effective and efficient performance.

4.3.2 Feeding

Animal productivity is directly related to the quality and quantity of fodder animals are provided with. Animals are either herbivores or carnivores. Some of the animals, however, consume both meat and vegetation, thus known as omnivores. Clean drinking water in sufficient amount is as important as the food. It is more economic to have fewer animals and supply them with sufficient food than to have more animals and less food (Gomez & Scialabba 2015). Like humans, a balanced diet is important for animals for optimum growth and productivity. It is important to note the fact that the type of fodders and quantity should be determined based upon the type of animal and its use (for eggs, milk, meat, fur etc.).

Herbivores are usually provided with feeds such as grass, hay, grains, excess crops and other crop by-products (fruits, vegetables, roots etc.). Poultry and fish are commonly fed factory-made food for faster growth and sufficient supply. Some farms buy feed from local sources while the majority of the farms in rural Nepal usually grow grass and other necessary crops by themselves. The basic components of feed are mentioned below:

- **Protein:** Protein is the most effective nutrient for growth of muscle and other body parts. Added amount of protein is effective for milk, eggs, and fur production as well. Grains are the major protein source for animals. Bovines, sheep and goats have bacteria in their digestive tracks which can convert nitrogen compounds into proteins (Holden & Loosli 2018).
- **Carbohydrates & fats:** Carbohydrates and especially fat contribute significantly to animal physiology as they provide energy and also maintain the body temperature. Plants are the major source of carbohydrate for herbivores while that for carnivores and omnivores are supplied by fibre containing foods. (Holden & Loosli 2018.)
- **Minerals:** Minerals are basically elements and compounds needed in small portions for proper biological functioning in animal body. Minerals are considered important mainly for the development of bones, metabolic activities, nervous system and body fluids including blood etc. Deficiency of minerals can cause diseases while excess can also result toxicity and biological malfunctions. Examples of minerals are common salt, calcium, phosphorous, sodium, sulphur, iron, potassium, manganese, magnesium, iodine, chlorine, fluorine, copper, cobalt, zinc, molybdenum, selenium, chromium etc. (Chahal, Niranjana & Kumar 2008, 103-130.)

- **Vitamins:** Vitamins are an equally important aspect of animal feed. They are essential for the proper functioning of biological activities including reproduction, growth, maintenance, milk production, fur growth and immunity etc. Not all sorts of vitamins are supplied from one specific type of feed, thus mixed feeds are important. Vitamin supplements should be included in feed, if necessary. There are two categories of vitamins, namely fat-soluble vitamins and water-soluble vitamins. Fat-soluble vitamins are vitamin A, D, E and K. Water-soluble vitamins include Vitamin B & C, thiamine, choline, biotin, folic acid, pantothenic acid, riboflavin and niacin. (Chahal et al. 2008, 131-168.)

4.3.3 Health and disease management

As the famous saying states ‘Prevention is better than cure’, the best way to treat animals regarding their health and wellbeing is to eradicate or limit the sources of health hazards. Health and disease management is important for both the animal welfare and productivity. It is necessary to understand that there are various possible sources of diseases and other health issues. Without understanding and locating the cause, these problems are almost impossible to prevent or cure. Before conducting an animal farm, one needs to know about possible diseases in the animals, their severity, mode of transmission and effects. The availability of veterinary service is essential for all animal farms.

As discussed in the earlier section, both the deficiency and excess of nutrients may result in different diseases and abnormalities in animals. The food, water and air can also cause serious health problems if they are contaminated with toxic substances. Moreover, there are several other infectious diseases which are transmitted through food, water, air, direct contact and vectors. Not to forget, some diseases and health issues can be transmitted to the offspring genetically. There are a few animal diseases which can even be transmitted from sick or apparently healthy animals to human beings, and they are called zoonoses.

The basic approaches to prevent health hazards are improved breed, good shelter, nutritious and balanced diet, hygiene and proper care. Moreover, vaccines and antibiotics are also given to animals to make them more resistant to certain diseases. Like humans, regular health inspections must be conducted on farm animals so that necessary steps can be taken before it is too late. According to Agriculture Victoria (2017), below is a list of common animal diseases

- Bluetongue Virus
- Anthrax
- Blue-green Algal poisoning
- Clostridial disease
- Heliotrope toxicity
- Leptospirosis
- Rabies
- Measles
- Pink-eye disease
- Lumpy jaw/skin
- Swine flu
- Avian influenza (bird flu)
- Footrot
- Helminth problem
- Tick problem
- Tuberculosis. (Agriculturevictoria 2017.)

TABLE 17. Common animal zoonoses contagious to human (Agriculturevictoria 2017)

Bacteria	Protozoa	Fungi	Virus
Anthrax Brucellosis Escherichia Coli Leptospirosis Listeriosis Mycobacterium Psittacosis Salmonellosis Streptococcus Q-fever	Cryptosporidiosis Giardia Toxoplasmosis	Ringworm fungi	Hendra Nipah Menangle Lyssa Rabies Orf

4.3.4 Breeding and other products

Breeding is one of the important aspects of animal farming. Animal breeding should be taken care of, generally, for two reasons; first is to grow farm animals in numbers and second is animal welfare regarding their natural reproductive cycles. Since healthy parents give birth to healthy offspring, breeding animals must be given proper care. Sanitation and health are the most basic factors to be assessed for breeding animals. They are in fact the most important factors for production of any other animal products. Within the same animal species, there can be various breeds. One breed can be more suitable to a particular environment and other breeds in different environments. Moreover, one breed can be superior than others concerning growth, fitness, disease resistance, environment adaptability and dairy/fur/eggs production.

The choice of the most suitable breed for a particular environment or production system should be priority before starting animal breeding and serious attention must be paid to the adaptive capability of the breed. The adaptive performance is characterized by the traits relating to survival, health and reproduction in given environment. A purebred is a breed of animal whose genetic history is recorded. The purebred has certain desired qualities (adaptive capability, productivity, body-mass etc.) which are expressed due to the dominant gene in its DNA. It is used as a parent for further production so that the desired qualities are genetically transmitted to the offspring. There are two basic categories of breeding practice as mentioned in following paragraphs. (Oldenbroek & Waaij 2015.)

Inbreeding is a practice where two close relatives are used as parents. Since the parents have a common ancestor who passed on same alleles to both, they are genetically more alike than two non-related individuals. Inbreeding, therefore, creates a higher probability that the both parents pass the shared alleles to their offspring. One needs to be careful because the inbred animals have potential to be less healthy, have shorter life-span, have less milk/egg/fur production capacity or have a decreased reproductive capacity. In some cases, the inbreeding parents can have common recessive genes with potential for diseases and disorders. If the recessive genes from both parents are transferred to a offspring, the diseases and disorders are more likely to be expressed. Though it might be practically impossible to stop the inbreeding among farm animals, a farm should not make it a normal practice. (Oldenbroek & Waaij 2015, 125-128.)

Cross breeding is the breeding system where two individuals from different breeds are used as parents. Genetically, the crossbreds are most likely to combine the characteristics of both parents. For several

characteristics, they even show better performance than their parents. Moreover, in the DNA of a cross-bred, genes with the negative effects such as diseases and disorders become recessive. Therefore, the major objectives of cross breeding are that the offspring have improved health and reproductive capacity. Bigger body-mass, better adaptive capacity and increased productivity are other purposes of the cross breeding. (Oldenbroek & Waaij 2015, 128-141.)

The new-born babies require significant attention specially during their early age. New-borns are usually weak, and they need a warm and safe environment. Animal babies normally feed their mother's milk only during the first few months, before they develop digestive capacity for other foods. After a certain number of days or months (according to type of animal) from the birth, the babies should be vaccinated and de-wormed. Furthermore, attention should be paid whether the animals are growing, moving or feeding properly; if not, a veterinarian should be consulted. In addition, the mother should also be treated with much care during pregnancy and after.

4.4 Logistics

Logistics is undoubtedly a critical dimension of the agricultural value chain. Logistics not only refers to the flow of goods, but also includes the exchange of information and money required for proper functioning of a supply chain. An effective and efficient logistics management is the collective effort of all stakeholders rather than solely that of a farm or any other stakeholder. Effective logistics implies providing the right product, at the right amount, of the right quality, at the right time, at the right place and at the right price. Due to the modern networking facilities such as telephone and internet communications, the exchange of information is at tremendous ease and speed. However, in a developing country such as Nepal, the major limitations to logistics are the transportation and storage facilities. Poor road conditions, the lack of storage facilities and lack of appropriate transportation vehicles are the reasons why rural agricultural farms struggle to thrive in Nepalese market. Though challenges do exist, there are ways to overcome them. (Szymonik 2012, 10-13.)

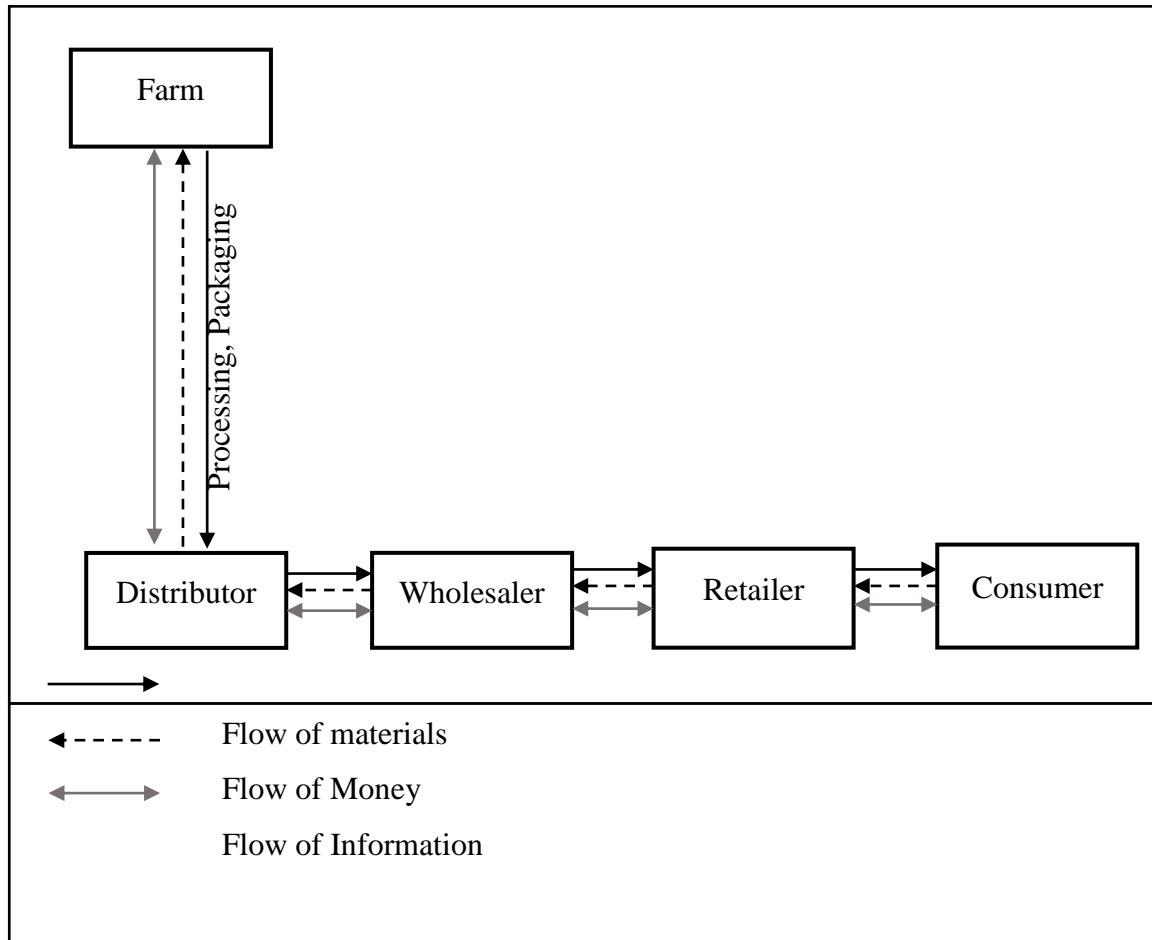


FIGURE 7. General flow of goods, information, and money from farm to consumers

There are two basic types of transportation related to the farm. The first is on-farm transportation and the second is off-farm transportation. According to Gebresenbet and Bosona (2012), examples of some specific transportation activities belonging to each category are mentioned below.

On-farm transportation activities:

1. Within fields:

- Distributing fertilizers, seeds, pesticides, water, and other products
- Collecting the harvest and plant residues

2. Transporting agriproducts to the farm storage from fields

3. Transporting necessary tools, fertilizers, seeds, pesticides, and other products between fields and farm.

Off-farm transportation activities:

1. Transporting products to the processing units and markets
2. Transporting necessary supplies from the market to the farm
3. Transportation to the health care centre and other related organizations.

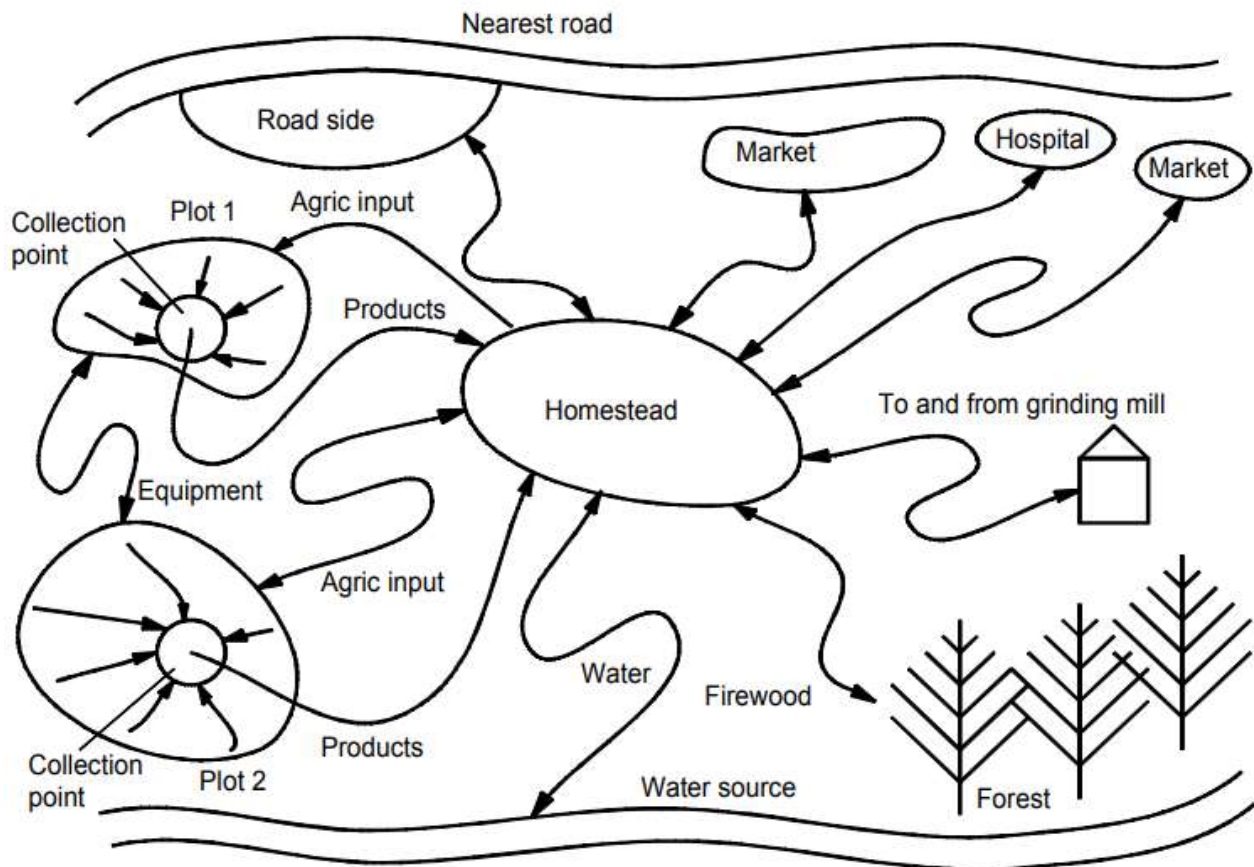


FIGURE 8. Transportation activities of a small agricultural farm (Gebresenbet & Bosona 2012, 129)

Proper post-harvest storage, processing and packaging are very important functions in modern logistics. In the lack of these facilities, farmers in rural areas may suffer a significant loss of products. Farmers and transportation personnel should be provided with trainings and knowledge about proper material handling techniques so that the loss would be reduced or eliminated. An integrated effort of stakeholders in the value chain is the ideal way out to conduct efficient and effective logistics (Sweeney 2012).

People throughout the globe are becoming more conscious of whether the food is organic, high-quality and safe. In addition, consumers are concerned whether or not the farms have considered sustainable farming, transparent functions and the well-being of animals. In meat industry, research suggest that the

quality of meat can be damaged due to stress faced by animals during their transportation to the slaughterhouses. Therefore, it is important to use suitable transportation vehicle and conduct proper animal handling techniques. The animal's stress level is very high during the loading and unloading into/from the vehicle. To overcome this problem, loading and unloading facilities must be improved along with driver's driving performance. (Gebresenbet & Bosona 2012.)

Moreover, there are other agricultural products such as meat, milk, eggs, tomatoes etc. which are very vulnerable to environmental conditions (temperature, aeration etc.) and physical forces (pressures, packaging, stowability, vibrations, road jolting etc). Depending on the production capacity of the farm and the costs of outsourcing, one must decide whether to own a transportation vehicle or to outsource the transportation activities. Furthermore, if the consumers are distributed in a large area and several farms function independently, then coordination can be done with other farms to improve food supply, market development, network integration and logistics efficiency (Sweeney 2012). The coordination and network integration can increase the accessibility of farms to important information/data related to both existing and potential market (Sweeney 2012, 15-20). To sum up, an integrated logistics management is required for improved logistics performance. Adequate and improved storage, processing and transportation facilities are essential for achieving optimum production, quality food, animal welfare, sustainability as well as economic excellence.

5 MARKETING

Though a specific, universally accepted definition of marketing does not exist, marketing in general refers to the functions of a firm related to selling, promoting and delivering the products to consumers. The goal of a successful marketing is to satisfy the consumers while making sure organizational goals are met. The nature of the market is not stable since there are several factors affecting the supply and demand of a product. This means that marketing decisions need to be carefully made and changed according to the situations. According to Erminia Guercio (2018), following things are necessary to make a successful marketing decision

1. Price information (current costs and estimated costs in future)
2. Market analysis (previous trends and the current situation)
3. Outlook (a well-researched opinion of the possible market situation in future)
4. Market strategy (for current and possible changes in future).

Depending on the type of distribution network that farm intends to participate in, it must decide whether to focus more on Business to Business (B2B) marketing or Business to Consumer (B2C) marketing. One should build and sustain necessary relationships with the customers. In addition, one needs to acknowledge the fact that a conflict of interest might occur between the farm and other stakeholders in the agricultural value chain. This is mainly because the farm is interested in good return and high quantity production, while distributors, wholesalers, retailers and consumers are more interested in a lower price and high quality (Davies 2001, 129-130). Such a conflict of interest must be carefully handled to achieve a win-win situation for all. One must not hesitate for co-operation, co-ordination and interactions with other stakeholders so that the farm's marketing function is effective and agile despite the aforementioned conflict of interest.

5.1 The role of supply and demand in marketing

To create an effective marketing plan and to execute it, it is important to understand the nature of supply and demand, which directly or indirectly guides the changes in the market. In other words, understanding the supply and demand is crucial to formulate marketing strategy in terms of Price, Promotions, Place and Product, also known as the marketing mix or the 4Ps (McCarthy 1960).

5.1.1 Supply

Supply is the quantity of products, newly produced or from the inventory, which is available to be sold in the market. Average market supply thus refers to the quantity of a product all suppliers can sell in the market at any given time over a price-range. Market supply is subject to increase or decrease due to forces such as technology, price of raw materials, price of substitute products and unforeseen events. At an individual level, a supplier is willing to sell a particular quantity of product, provided that the selling price is equal to or greater than the cost of production (Guercio 2018).

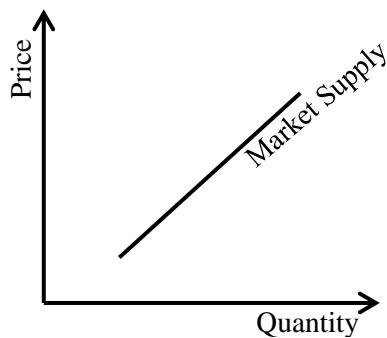


FIGURE 9. Supply Curve

As shown in figure 10, suppliers are willing to produce more if the market price of a product increases. This phenomenon of the increased market supply in response to the unit rise in price is called supply elasticity. If the market supply of a product increases largely upon unit increase in price, the supply market is considered elastic. If the market supply does not increase or increases slightly upon the unit increase in the price, supply market is considered respectively as inelastic or slightly elastic. The elasticity of supply is subject to various factors as mentioned below. (Guercio 2018.)

- Cost structure of suppliers,
- Supplier's expectation of price (extent of increase and permanency of change),
- Storability or perishability of product,
- Ease of changing output to other products,
- Time (since the change of price occurs).

5.1.2 Demand

Demand refers to the quantity of products which consumers are willing to purchase in the market. Aggregate market demand implies to the quantity of a product that consumers are willing to buy over a price-range at any given time. In contrast to supply, demand decreases as the market price increases. The market price is not independent of the supply or demand. In fact, the market price is an outcome of the balance between the supply and demand. The following figure shows how demand and supply determine the optimum market price, also known as the equilibrium price. (Pindyck & Rubinfeld 2005, 21-24.)

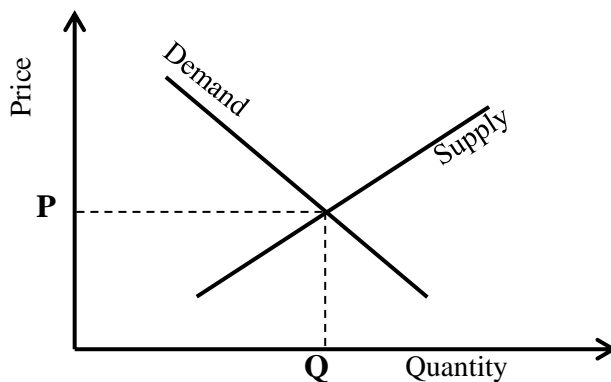


FIGURE 10. Price Equilibrium

In figure 11, P is the equilibrium price. At prices lower than P , consumers might be willing to buy more but the suppliers may not be interested in creating more supply. This leads to a shortage of a product and consumers will pay more to get the product they want. At prices higher than P , consumers might not be willing to buy the product, but suppliers may produce more. This creates surplus in the market and suppliers will lower the selling price to ensure that their products are sold. Both situations eventually lead to a situation where demand and supply is balanced at a market price, thus known as price equilibrium. (Guercio 2018.)

5.2 Marketing Strategy and Promotions

Creating an effective and sustainable marketing strategy is essential for efficient performance and profitability of a farm. In addition, planning and the executing right kind of promotional activity are crucial. A farm's profitability is not irrespective of the industry it belongs to, rather it is fundamentally influenced

by the attractiveness and structure of the industry. Nonetheless, the industry's attractiveness is the reflection of collective performance of the farms within it. At an individual level, a farm can contribute to the attractiveness of the industry by attracting consumers and satisfying them. Furthermore, a farm's profitability is guided by its competitive position in the industry. The competitive position is determined by its pursuit of competitive strategy and the execution of promotional activities. The better the competitive position of a farm in an industry, the higher is the potential for its profitability. (Porter 1985.)

5.2.1 Generic Strategies for Competitive Advantage

For a farm to thrive in the recent competitive market, it must have a competitive advantage against its competitors. Michael E. Porter (1985) published a book named *Competitive Advantage: creating and sustaining superior performance*, in which he explores how the competitive advantage can be created and implemented in an industry. According to him, five competitive forces exist in an industry, which influence the prices, costs and necessary investments in that industry. Porter argues that a competitive strategy should be formulated after thorough understanding of the rules of competition. The ultimate goal of the competitive strategy is to adapt with and change the rules into the farm's favour; the rules of competition are embodied in the five competitive forces (Porter 1985).

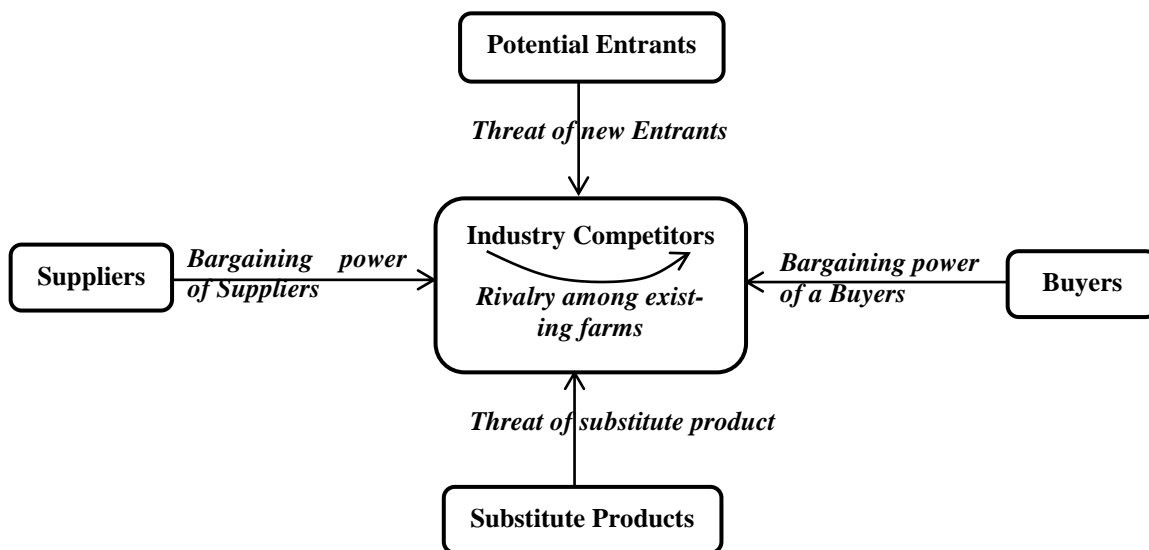


FIGURE 11. Five Competitive Forces that determine industry profitability (Porter 1985)

Porter (1985) argues that the competitive advantage can be achieved in two basic ways, which are collectively known as the Generic Strategies for Competitive Advantage. In a broad market, a generic strategy is either to achieve the price competitiveness or to provide unique products. In a focused market, a similar strategy can be applied to create a competitive advantage against the competitors. Porter insists that a farm is most likely to succeed if it sticks with one suitable strategy rather than applies more strategies at the same time.

		Competitive Advantage	
		Lower Cost	Differentiation
Competitive Scope	Broad Target	Cost-Leadership	Differentiation
	Narrow Target	Cost-Focus	Differentiation-Focus

FIGURE 12. Generic Competitive strategies for Competitive Advantage (Porter 1985)

Cost-leadership is a strategy through which a farm is able to sell its products in the market at lower prices than its competitors without reducing the product quality. A farm can achieve such a strategy through cost reduction in one or several stages of the value chain. The sources of cost reduction are economies of scale in production, access advantage to raw material and technological proprietorship (Porter 1985). It is suggested that the farms applying the cost-leadership strategy must locate and make the most of all possible sources of cost advantage, which is important because the cost-leadership strategy is considered successful only when the farm is the cost-leader in the industry (Porter 1985).

Differentiation, as the word suggests, is another generic strategy wherein a farm's products are different in one or more attributes than the competitor's products. This is an approach of satisfying consumer needs with uniqueness. The benefit of such a strategy is that the consumers are willing to pay premium

prices for such products. Unlike cost-leadership, several farms can be practicing the differentiation strategy. If such a scenario exists, one must be cautious whether the cost of production and selling price are reasonable in the contemporary market conditions. Creativity and innovation are the backbone for differentiation, and that is why uniqueness can be created at tremendous levels of product attributes and value chain activities. The differentiation can be based on the product itself, delivery systems, retailing networks, aftersales services, product durability, marketing approach, parts availability and several more. (Porter 1985.)

Cost-focus strategy differs from the previous two in terms of the size of the targeted market. Cost-focus is also an approach to achieve cost advantage, similar to cost-leadership, but in a narrow market. Focusing on a narrow segment of the market, a farm might be able to exploit the cost behaviour of that particular segment better than farms which serve a broad market. A farm can be the cost-leader in a market segment which has attributes such as ease of delivery, high purchase volume, cheap local production and more. The target market must have different need, structure, resource accessibility or buying behaviour than the rest, in order to succeed with focus strategies. (Porter 1985.)

As discussed earlier, certain market segments might have some special needs which are unlikely to be fulfilled by farms with a broad target-market. If a farm focuses on such a market segment and fulfils the needs, it can outperform other farms in that segment. This approach of fulfilling special needs or desires of a narrow market, with specialized products, is called differentiation-focus strategy. Though it may sound fruitful in the short run, one needs to consider the sustainability of this competitive advantage because the consumer behaviour and technology evolve with time. (Porter 1985.)

5.2.2 Promotions

Promotion has always been one of the key elements in the history of marketing. It is indubitably a significant and indispensable aspect in the agriculture industry. Promotion is important because people tend to have a psychological longing to know about the products before using them. This psychological void can be filled and exploited for the benefit of one's farm, through the carefully constructed promotional contents and approaches. Promotional activities are, therefore, required to be planned and performed creatively as they can spread the product information and build trust to the consumers. Good promotional materials have the ability to catch attention, educate about the product, create trust and encourage to make a purchase (Edwardlowe 2015). Based on the product, the farm's objectives, available budget and

the nature of targeted market, a farm can choose one or more of the following methods of promotion (Healey 2013).

- **Advertising:** Advertising is a one-way communication method. Newspaper, magazines, radio, television, social media and posters are the commonly used media to broadcast the advertisement materials to consumers.
- **Direct Marketing:** Direct marketing implies contacting or reaching to the potential consumers directly through telephone, emails, mails or coupons.
- **Sales Promotion:** Sales promotion activities are intended to motivate and engage the potential consumers. Exhibitions, price offers, samples distribution and in-store demonstrations are a few of the tools for sales promotion.
- **Personal selling:** This is the best way of promotion for a two-way communication, since both the seller and the consumer meet face-to-face. Sales representatives encourage, inform, and suggest the potential consumers to purchase the products from their firm.
- **Public Relations:** Public relations play a significant role in building and sustaining the positive image for a firm. Branding, media-exposure and good-will are the fundamental outcomes of public relations activities. Examples of public relations activities are hosting events, sponsoring programmes, doing charitable works, conducting social/environmental campaigns and communicating to the media. (Healey 2013, 5-11.)

6 STRATEGIC FINANCIAL MANAGEMENT

Running any kind of a business requires finance. Finance can be known alternatively as the capital, fund or an investment. Due to its significance in every economic activity, the finance can be called as the lifeblood of businesses (Paramasivan & Subramanian 2009). Financial management is a set of activities concerned with acquiring, financing and managing of the assets with motive to create value and maximize the profit (Horne & Wachowicz 2008). According to Horne & Wachowicz (2008), the decisions related to financial management can be categorized into three major categories, namely investment decisions, financing decisions and asset management. All of the three decisions are equally important for proper financial management. However, one must acknowledge that the decision making is merely a part of financial management. A firm must carry out an analysis, planning, auditing, control and evaluation both before and after the decision making. Pobal (2018) argues that the following skills are essential in an organization for a sound financial management.

- Budgeting
- Report writing
- Bookkeeping
- Data analysis
- Financial management systems
- Communication

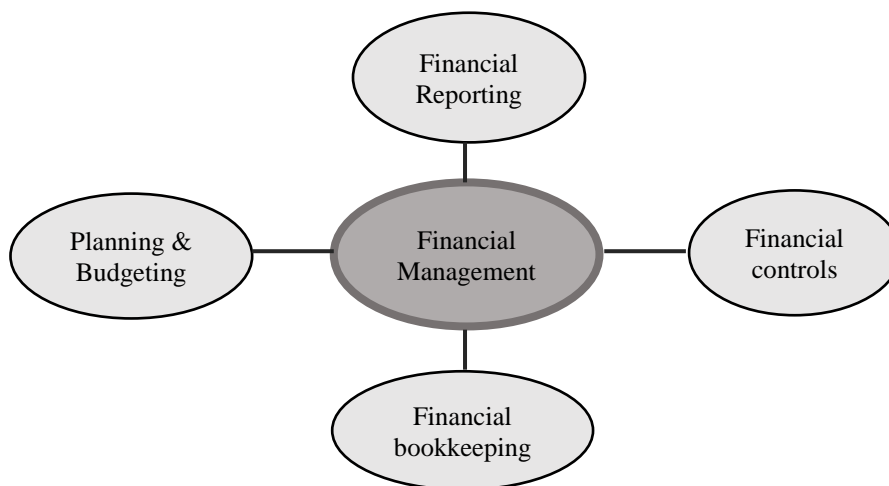


FIGURE 13. The key elements of financial management (Pobal 2018, 6)

6.1 Capital management and government subsidies.

An investment is required to start any business. According to the type of the company and the planned business functions, the amount of the investment may differ. Business owners may invest their own money or take a loan from other people or financial institutions. A part of the investment is deposited in a bank or a financial institution for future transactions, while some of the investment is used to purchase or build assets such as buildings, land, machinery, equipment and technology. According to Paramasivan and Subramanian (2009), the capital is the total monetary value held by a company as assets and deposit in financial institution. In order to make an estimation of how much capital is required initially, one must understand the costs of all factors of production and operational expenses. The factors of production include building, land, technology, machines, equipment, human resource, raw materials and other fixed assets

Before borrowing money from a bank or any other financial institution, one needs to find out whether there are any other financial institutions which can lend money at more affordable interest rates. In addition, one must find out whether the government provides subsidies to the business. For providing institutional credit to people willing to conduct business in agriculture industry, Nepal government has established a bank known as Nepal Agriculture Development Bank Limited (ADBL). ADBL, founded in 1968, provides loans for agricultural purposes at lower interest rates compared to other financial institutions. In addition, Nepal government has made provisions for various subsidies such as agro-based subsidies, interest subsidies on loan, subsidies on export and subsidies for acquisition to cooperatives (Gautam 2018). One must inquire about necessary procedures and preconditions from concerned government body before applying for a subsidy (Gautam 2018).

Nepal's budget for the fiscal year 2018/19 has made provision that the government will provide a twenty-five percent subsidy for acquisition of necessary machinery for fruit, milk, vegetable and meat processing companies operating through cooperatives. The budget also states that a twenty-five percent capital grant is provided for establishment of silk, cotton and wool processing industries. The budget has expanded the scale of Prime Minister Agriculture Modernization Programme. Under the programme, the government provides a fifty percent subsidy in purchase of a tractor, a power tiller, agricultural equipment, seeds and fertilizers. The programme has made provision to provide a subsidy up to one million NRs. in purchase of 39 different agricultural mechanical tools. However, one must own five hectares of cultivable land to get the subsidy on purchase of tractor and 1.5 hectares of cultivable land

to get the subsidy on purchase of power tiller. Furthermore, the budget for the fiscal year 2018/19 has made the following provisions of interest subsidies on loans. (Nepal's Budget for Fiscal year 2018/19.)

In order to encourage youths with higher education to start their own business, arrangements will be made to provide loan up to NRs. 700 thousand with a 5 percent subsidy in interest rate against collateral of their academic certificates. There will be compulsory provisioning of credit guarantee and insurance of such businesses (Nepal's Budget for Fiscal year 2018/19, 25).

Loan (on collective guarantee) of up to NRs. 1 million at 5 percent subsidy will be provided for each Dalit community by socially integrating them to run business through cooperatives and community production system (Nepal's Budget for Fiscal year 2018/19, 62).

An arrangement is made to provide 6 percent interest subsidy on collective project-based loan up to NRs. 1.5 million operated by women through development of their entrepreneurship, skill development and training (Nepal's Budget for Fiscal year 2018/19, 103).

6.2 The financial statements

Financial statements reflect the financial performance of a company. They are good source of information on how the company's current financial situation is and how the future looks like financially. There are three basic types of financial statements, namely income statement, balance sheet and cash flow statement. An analysis of financial statements is the process to determine performance, suitability and sustainability of the company or its functions. Companies usually make a report after the analysis. The report gives a sense of position and direction to the stakeholders. The widely used method of financial analysis is ratio analysis which determines the profitability, liquidity, solvency, cash flow and investment returns etc. In some cases, an entrepreneur presents the financial statements (with estimated costs, sales, liabilities and returns etc. for approximately 3 years) and analysis to the investors before starting a business. This allows the investors to evaluate the feasibility and profitability of the business and decide whether or not to provide a fund to the entrepreneur. Therefore, the entrepreneur must carry out a detailed study of the market, costs, expenses and obligations before preparing the financial statements for a start-up. (Horne & Wachowicz 2008.)

6.2.1 Income statement

The income statement is also known as the profit-loss statement. As the name suggests, a profit-loss statement provides the quantitative measure of a company's profit and loss in a given time period. In addition, the income statement outlines all the sales and sources of income and expenses. It is helpful in comprehending the company's financial performance. A sample draft of income statement is presented below.

TABLE 18. A sample draft of an income statement (Daves 2019, 9-10)

Sales	*****
- Cost of goods sold:	
(Initial inventory	****
+ Purchases	****
- Closing inventory	****
- Wages and benefits)	****
Gross profit	*****
- Operating expenses:	
Advertising	****
Electricity	****
Water	****
Telephone	****
Rents	****
Stationary	****
Insurance	****
Repair and maintenance	****
Professional fees	****
Non-recurring expenses	****
Other expenses	****
Depreciation	****
Interest	****
Income before tax	*****
-Tax	****
Net profit/loss	*****

6.2.2 Balance sheet

The Balance sheet is alternatively known as the statement of financial position. A balance sheet generally consists of three basic items which are assets, liabilities and equity. The balance sheet provides a picture of a company's growth in terms of financial capability. One can comprehend whether the company is able to pay debts or expand its functions. A sample draft of a balance sheet is presented below.

TABLE 19. A sample draft of a balance sheet (Daves 2019, 4-5)

<u>Assets:</u>	
Cash and cash equivalents	****
+Receivables	****
+Inventories	****
+Prepaid expenses	****
Total current assets (A)	*****
Fixed assets	****
-Depreciation	****
+long term investments	****
Total non-current assets (B)	*****
Total assets (A+B)	*****
<u>Liabilities and equity:</u>	
Debts due in one year	****
+Accounts payables	****
+Accrued expenses	****
Total current liabilities	*****
+Long-term debts	****
Total Liabilities (C)	*****
Capital	****
+retained earnings	****
-drawings	***
Total equity (D)	*****
Total liabilities and equity (C+D)	*****

6.2.3 Cash flow statement

The cash flow statement illustrates the sources of the inflow of cash and its use or the outflow during a given time period (Paramasivan & Subramanian 2009). Analysing the cash flow statement, one can determine whether a particular decision/spending made for the company yielded expected returns (Horne & Wachowicz 2008). The cash flows are divided into three categories under the operating, investing and financing activities as shown in the draft below.

TABLE 20. A sample draft of a cash flow statement (Zions Bank 2019)

Income before tax	****
+ Depreciation	****
+ Amortization	****
+ Bad debts written off	****
+ Interest expense	****
+ Impairment loss	****
+ Decrease/ (- Increase) in inventory	****
+ Decrease/ (- Increase) in trade receivables	****
+ Increase/ (- Decrease) in trade payables	****
- Income tax paid	****
Net cash provided by operating activities (A)	*****
Capital expenditure	****
+ Purchase of investments/asset	****
- Interest received	****
- Proceeds from sales of assets	****
Net cash used in investing activities (B)	*****
Proceeds from issuance of stock	****
+ Received loans	****
+ Capital contribution by owner/partner	****
- Repayment of loans	****
-Interest expense	****
- Dividends paid	****
Net cash provided by financial activities (C)	*****
Net cash inflow = A -B +C = *****	

6.3 The financial analysis with ratios

The financial ratios are used to assess the company's profitability, liquidity, growth, margin, valuation, rate of return etc. The ratios are the methods of calculating the relative size of one number in comparison to another. A particular type of ratio can be compared to the same ratio calculated for previous financial periods to determine the change in company's performance. Nevertheless, one must not neglect the fact that there are various underlying factors which can affect the ratios and even lead to wrong analysis. Before making any conclusion on the basis of an outcome from a ratio, one should always try to understand the reasons for that outcome and factors which indirectly affect it. The ratios are generally categorized into four broad categories, which are liquidity ratios, leverage ratios, activity ratios and profitability ratios. (Bragg 2019.)

6.3.1 Liquidity ratios

The liquidity ratios are used to determine a company's ability to stay in business after paying its short- and long-term debts. Basically, there are three types of liquidity ratios. The first is current ratio which measures the company's ability to meet current liabilities with current assets. The second is quick ratio which is also known as the acid ratio or acid test ratio. A quick ratio is similar to current ratio, but inventory is excluded from the current assets in calculation. The last is cash coverage ratio to whether the available cash is sufficient to pay the company's interest. Higher values of ratios indicate better liquidity of the company. The formulae for ratios are given below. (Guan 2003.)

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

$$\text{Quick ratio} = \frac{\text{Current assets} - \text{Inventory}}{\text{Current liabilities}}$$

$$\text{Cash coverage ratio} = \frac{\text{Earnings before interest and tax} + \text{Non-cash expenses}}{\text{Interest expense}}$$

6.3.2 Leverage ratios

The leverage ratios indicate how a company is depending upon debt to fund its operations and whether it is capable of fulfilling its fixed obligations such as fixed costs, mortgage, interest or lease payments. There are three basic types of leverage ratios namely the debt to equity ratio, interest coverage ratio and fixed charge coverage ratio. The debt to equity ratio indicates the relative use of debt and equity to finance the company's assets. A larger value of debt to equity ratio suggests that the company is depending more on debt to fund its investments rather than equity. The interest coverage ratio and fixed charge coverage ratio determine the company's ability to pay the interest and fixed costs respectively with its income. Larger values of coverage ratios correspond to the better ability of a company to pay its interest or fixed costs. Mathematically, the ratios are presented as follows. (Drake 2015.)

$$\text{Debt to equity ratio} = \frac{\text{Total debt}}{\text{Equity}}$$

$$\text{Interest coverage ratio} = \frac{\text{Income before interest and tax}}{\text{Interest expense}}$$

$$\text{Fixed charge coverage ratio} = \frac{\text{Income before interest and tax} + \text{Lease payment}}{\text{Interest expense} + \text{Lease payment}}$$

6.3.3 Activity ratios

The activity ratios show how effective a company is in utilizing its resources. There are five major types of activity ratios. First, a fixed asset turnover ratio helps to understand how effectively the investment on fixed asset creates sales. The second, a working capital turnover ratio measures how effectively the working capital is used to create sales. Next, the accounts payable and accounts receivable turnover ratios determine how often the company pays its suppliers and collects receivables respectively in a year. The last, an inventory turnover ratio assesses the average time the inventories stay in company warehouse. The mathematical equations of the ratios are given below. (Bragg 2019.)

$$\text{Fixed asset turnover ratio} = \frac{\text{Total sales}}{\text{Total fixed assets}}$$

$$\text{Working capital turnover ratio} = \frac{\text{Total sales}}{(\text{Beginning working capital} + \text{Ending working capital})/2}$$

$$\text{Accounts payable turnover ratio} = \frac{\text{Total supplier purchase}}{(\text{Initial accounts payable} + \text{Ending accounts payable})/2}$$

$$\text{Accounts receivable turnover ratio} = \frac{\text{Net annual credit sales}}{(\text{Initial accounts receivable} + \text{Ending accounts receivable})/2}$$

$$\text{Inventory turnover ratio} = \frac{\text{Annual cost of goods sold} * 365 \text{ days}}{(\text{Beginning inventory} + \text{ending inventory})/2}$$

A high fixed asset turnover ratio means that either the company uses its fixed assets very effectively or it is outsourcing various production activities. The opposite indicates that the company has over-invested in the fixed assets which are not productive. A high working capital turnover ratio suggests that the company uses current assets and current liabilities effectively to generate revenue. However, the high ratio can be a result of rather substantial accounts payable. If the latter is the case, the company must immediately check its liquidity because a considerably large sum of accounts payable can lead the company to a bankruptcy. A low working capital turnover ratio is not desirable since it indicates the possibilities that the company has an immense sum of accounts receivables or inventory. (Bragg 2019.)

Regarding the accounts payable turnover ratio, it is better to have a high ratio because a low ratio means that the company pays suppliers slowly which can be a result of inadequate funds. One must be cautious that consistently slow payments might imperil the supplier relationship. A high value of accounts receivable turnover ratio indicates a frequent collection of accounts receivable, while the low value suggests inadequate or rare collection of the accounts receivable. In both cases, it is necessary to find out the reasons and their effects on the company's financial well-being. Finally, a high inventory turnover ratio (calculated in days) means that the company holds inventories for a long period of time, while the lower ratios indicate that the inventories are held for shorter periods of time. Again, in both cases the underlying reasons and effects must be contemplated carefully. Inventory management plays a significant role in the production process and financial management. It is important to acknowledge that if the inventory stays idle for a considerably longer period, it may be obsolete and lose its value. (Bragg 2019.)

6.3.4 Profitability ratios

The profitability ratios are used to measure the capacity of a farm to create profit or the returns. Basically, there are five types of profitability ratios which are widely used in the financial analysis. The first is the breakeven point units, which determines the total units of products that need to be sold at a given price to cover the fixed expenses. The second is the gross profit ratio which measures the gross profit as a percentage value of total sales. The third is the net profit ratio which is a percentage expression of the net profit to the total revenue. The next, return on assets ratio is the measure of profit as a percentage of net assets. Lastly, the return on equity ratio is the net income percentage of the total equity. The profitability ratios are usually used to compare the company's current performance to the performance in previous years. Graphs are used to illustrate the fluctuations of profitability ratios over time. The reasons and effects of fluctuations need to be carefully studied to support a sound financial performance in the future. The formulae for profitability ratios are given below. (NCERT 2018.)

$$\text{Breakeven point units} = \frac{\text{Total fixed expenses}}{\text{Unit sales price} - \text{Unit variable cost}}$$

$$\text{Gross profit ratio} = \frac{\text{Gross profit} * 100}{\text{Sales}}$$

$$\text{Net profit ratio} = \frac{\text{Net profit} * 100}{\text{Sales}}$$

$$\text{Return on assets ratio} = \frac{\text{Net profit} * 100}{\text{Fixed assets} + \text{Net working capital}}$$

$$\text{Return on equity ratio} = \frac{\text{Net profit} * 100}{\text{Equity}}$$

7 CONCLUSION

This thesis aimed to achieve two objectives. The first objective was to recognise, evaluate and emphasize various factors of the current business environment in Nepal which affect the start-up of an agricultural farm. The second purpose of the thesis was to create a foundation of strategic planning for the farm through a critical analysis of the available research works, exploitation of existing strategic tools and synthesis of valuable insights to succeed. The broadness of the thesis subject required the study of numerous aspects related to business management. Internationally, profound research has been done, in terms of both the numbers and in-depth knowledge, to facilitate the productivity and sustainability of the agricultural farms. However, the research on agriculture in Nepal seemed inadequate and rather challenging to access. Despite the limitations, this thesis has attempted to address all significant facets of strategic planning for the agricultural farm start-up in Nepal.

Throughout the study, it has been evident that the proper execution of each business function can make notable contribution to the overall performance of the farm. At times, depending on the situations in business, one or a few business functions might require more attention than others. Nevertheless, it is not wise to disregard the other functions totally. Moreover, in the context of Nepal, a farm has a better chance of survival if it is agile to cope with the changes in the external environment; be it the by changing its marketing methodologies or even switching to another product line. In a nutshell, a detailed strategic planning and sound preparation is vital for the success and sustainability of a farm start-up. This thesis is expected to contribute as the groundwork of strategic planning for agricultural farm start-ups and thereby assumes that it has successfully achieved its both objectives.

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